Vol. X. No. 3 MARCH, 1907

AUTOMOBILE MAGAZINE

Published by THE AUTOMOBILE PRESS
ANGUS SINCLAIR, Editor
136 Liberty Street, New York

MONTHLY
Price, 10 Cents

Automobiling

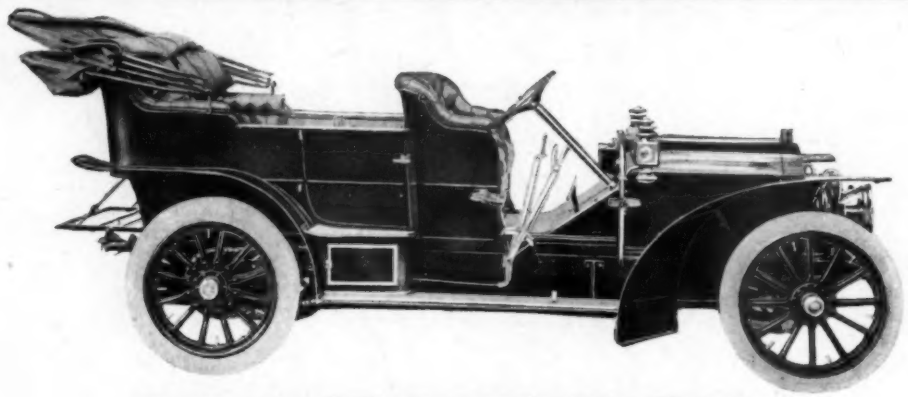
POPULAR ENGINEERING

ATTRACTIVE READING

COVERS ALL EVENTS OF THE MONTH

THE BEST ILLUSTRATED
AUTOMOBILE MAGAZINE

TEN CENTS



MATHESON

(LICENSED UNDER SELDEN PATENT)

Excels in construction and design the best automobiles built in America and equals the world's best for the reason that

Matheson principles in construction represents motor car perfection, in fact it is impossible to build a better, stronger, safer or more thoroughly dependable automobile

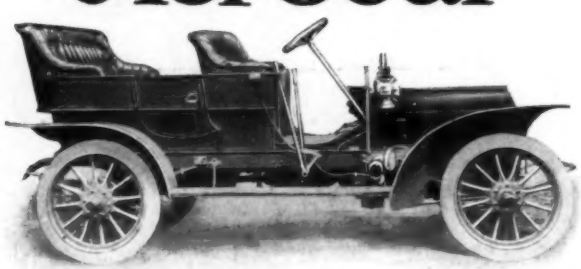
The Matheson Company of New York

1619-21-23 Broadway NEW YORK

REPRESENTED IN

Chicago, Ill.—The Matheson Co. of N. Y. Western Branch, 1321 Michigan Ave.
Philadelphia, Pa.—Titman, Leeds & Co., Broad and Cherry Sts.
Boston, Mass.—The Matheson Co. of Boston, 92 Mass. Ave.
St. Louis, Mo.—The Southside Auto Co., 2339 So. Grand Ave.
Richmond, Va.—Motor Transfer Co.
San Francisco, Cal.—The Matheson Co. of California, cor. Golden Gate and Van Ness Aves.
Rochester, N. Y.—Rochester Automobile Co., 150-170 South Ave.
Albany, N. Y.—Albany Garage Co., 28-30 Howard St.
Binghamton, N. Y.—H. D. Clinton Auto Co.
Calgary, Alberta, Canada.—A. S. Urquhart.
Watertown, N. Y.—Watertown Auto & Supply Co.
Cleveland, Ohio—Central Auto & Supply Co.
Newark, N. J.—Matheson Company of N. J., J. B. Ryall, 9 Clinton St.
Jersey City, N. J.—Hudson County Auto Co.
Long Branch, N. J.—Long Branch Auto Co.
Baltimore, Md.—The Matheson Co. of Maryland (R. E. Wood Lumber Co).

A Dozen Pointed Truths Regarding the Aerocar



$2,000 **Model "D"**

TRUTH 1—It is a long, rakish appearing car, not too small nor too large. It is low of build, giving great stability in action.

TRUTH 2—The best of materials are used in each part. You do not become a tester when you buy an Aerocar.

TRUTH 3—Accuracy in every detail of construction makes it a perfectly balanced, quiet, smooth running car.

TRUTH 4—The four-cylinder, air-cooled, 20 horsepower motor works right on, furnishing an abundance of power, summer or winter.

TRUTH 5—Every pound of motor power is transmitted to the rear wheels. The multiple disc clutch and the horizontal shaft absorb but little.

TRUTH 6—The finish and upholstering of the Aerocar is exceedingly fine and durable. You can justly be proud of your possession.

TRUTH 7—It will carry four persons with delightful comfort. Just the average number, with an abundance of room for all.

TRUTH 8—It is a rich man's car at a poor man's price. The greatest value in the 1907 market.

TRUTH 9—It is easy to understand. There are few parts. Every movement in the operation is the most natural.

TRUTH 10—It is extremely economical, winning many honors last season. The cost of maintenance is small—you can care for your own car.

TRUTH 11—You can run it daily—including Sundays—the year around. For touring, business or pleasure you can always depend upon this machine. It is "Built for Service."

TRUTH 12—You, Mr. Naught Seven Motorist, will be one of the smiling—not swearing—kind, if you buy one of these handsome Touring Cars.

If you want a Touring Runabout—we have it. If it's a big water cooled Touring Car you desire—see ours. Be sure and find our exhibit at Chicago and Detroit Shows.

THE AEROCAR CO.,

DETROIT, MICHIGAN, U.S.A. **Member A.M.C.M.A.**

LIBRARY of CONGRESS
Two Copies Received
MAR 5 1907
Copyright Entry
Jan. 15, 1907
CLASS B XXc., No.
136650.
COPY B.

Vol. X. No. 3. MARCH, 1907

AUTOMOBILE MAGAZINE

Published by THE AUTOMOBILE PRESS
136 Liberty Street, New York

Price 10 Cents

The Florida Races

The contests on the Florida beach during the last week of January were somewhat shorn of popular favor this year on account of the increasing popularity of the automobile exhibitions, which are succeeding each other in unbroken succession during the entire winter. As a result the attendance on the Ormond-Daytona beach was not nearly as large as formerly. As might have been anticipated, the entries were not as numerous, and in many quarters it is believed that the automobile contests at the popular winter resort have seen their best days. It is certain that the element of mere speed with racing machines is no longer of surpassing interest. The belief is general that the speed limit has been reached, and the question of practical utility has become, as it ought to be, of leading importance.

The weather was delightful, and the track—if the white expanse of sea beach may be called a track—was an ideal one. The beach has the peculiar quality of hardening as the receding tide leaves it, and the surface takes on a kind of iridescent glitter, arising from the minute particles of the shells of

FAR FROM THE BLIZZARDS.

crustacean mollusks that are mixed with the white sand. The surface is as smooth as polished jasper, and the flying wheels of the motor cars leave scarcely a mark of their passing.

The Stanley 30 horsepower racing car run by Mr. F. H. Marriott ran the best one mile in 29 3-5 seconds, almost equalling the record of last year. The American Mercedes, 70 horsepower, run by Mr. E. B. Blakeley, won the five-mile race from a standing start, making the distance in 4 minutes 25 seconds. The same distance open to all classes with a flying start was made by the Stanley steamer in 3 minutes 44 4-5 seconds. The one-mile American touring car championship was won by the Stanley 20 horsepower car driven by Mr. F. Durbin in 53 3-5 seconds. A five-mile match race between the Stanley steamer, 20 horsepower, and the American Mercedes, 70 horsepower, was won by the former in 3 minutes 51 4-5 seconds. The quarter-mile high-gear slow race for stock cars was won by the Stevens-Duryea in 1 minute 13 seconds.

On Wednesday, January 23, considerable interest was manifested in the 20-mile American touring car championship, which was won by a Welch 50 horsepower car driven by Mr. L. H. Perlman, in 22 minutes 32 4-5 seconds. On Thursday, January 24, the 100 miles, all classes race for the Minneapolis Trophy was won by the American Mercedes, 70 horsepower, in 1 hour 26 minutes 10 seconds. The Rolls-Royce, 20 horsepower car, run by C. E. Hutten, coming in second in 2 hours 2 minutes 35 seconds. The ten-mile open handicap was also won by the Mercedes, while the five-mile touring contest was won by a Wayne car.

On Friday, January 25, two Cleveland cars scored first and second in the six-mile handicap. An interesting event on the same day was the special match between a Rolls-Royce 20 horsepower car and a Franklin 30 horsepower. The distance was twelve miles, and the British car made the distance in 13 minutes 12 2-5 seconds, while the American car took 14 minutes 32 4-5 seconds to complete the distance.

Much regret was expressed at the disaster which befell the Stanley racing steamer, which nearly equalled the record of last year, and with which Mr. Marriott was attempting to break the record. It appeared that a slight indentation in the beach had the effect of throwing the front wheels in the air and the driving wheels skidding the machine literally went to pieces. Mr. Marriott has since almost completely recovered from his serious accident. The nature of the accident has turned the attention of many experts to the principle of a front drive, which may appear in much safer form next year.

Motor cycles were much in evidence and several special matches were run the best recorded mile being made by the Curtis, two-cylinder, run by Mr. H. G. Curtis in 46 2-5 seconds.

Evolution of the Car

The development of the wheeled carriage can be traced to the war chariot. The earliest record found of a carriage proper being used was when Charles of Anjou and his queen entered Naples in 1280 riding on a caretta. When an imitation of this article of supreme luxury was first seen in England, the word caretta was shortened to car, but under the Norman sway it was Frenchified into chariot or coach, the latter word being a corruption of the word coucher—to recline.

Through long years of development the rude, springless wheeled box grew into the comfortable covered coach carried on steel springs or leather throngs. The luxurious ideas that first demanded elaboration of the carriage took the form of highly ornate carvings and heavy gilding. The ancient specimens of the carriage-makers' art, still preserved in the museums of Europe, are wonders only for the laborious efforts that had been devoted to making them costly possessions.

The covered carriage originated in a small canopy, supported by four pillars, with curtains for front and side protection. It was not till after Queen Elizabeth's time that glass was used as a comfort and protection in carriages, although very ornate trappings were attached to them before that period. In the time of Charles II. Pepys notes in his famous Diary that on "May 1, 1665, after dinner I went to the tryall of some experiments about making of coaches go easy, and several we tried, but one did prove mighty easy (the whole of the body lying on one long spring), and we all, one after another, rid in it, and it is very fine and likely to take." That is the first authentic account of a decided improvement in the arranging of carriage springs, but they had been used in a crude form previously.

The arrangement of springs mentioned by Pepys was probably only fine by comparison, for after the middle of the eighteenth century springs were not used except for the more luxurious style of carriage. A French writer of that time mentions the application of springs to the four corners of a perch carriage. The springs were fastened to upright posts, and leather braces went from the top of the springs to the bottom of the body, causing excessive swinging, jerking and tilting when the vehicle was in motion.

Toward the end of the eighteenth century, carriage building became one of the most perfected trades in Europe. A carriage that was used by the Emperor Napoleon during part of the Russian campaign is preserved in a London museum, and is a model of convenience, comfort and strength. The French Academy of Arts encouraged the best of work in the carriage-building trade, and the vehicles built would have compared favorably with the work of to-day.

When attempts were first made to apply steam to the propulsion of vehicles on common roads the carriages used for the purpose were models of strength and lightness. The carriage or its propelling mechanism was in no way responsible for the failure of the first automobiles.

The first passenger cars used upon American railways were road-carriage bodies placed upon frames carried by flanged wheels. The pioneer American railways engineers not being hampered by the necessity of adhering to ancient forms, soon discovered that the road coach was not adapted to railroad trains and they devised a car suitable for the purpose, and from it developed the modern passenger car. In Europe they worked on the line of developing the road coach to suit railway conditions, and it resulted in what is known as the compartment carriage. That is now gradually disappearing and the American style of car is taking its place.

Sensible Automobile Rules

The views of ex-President Scarritt, of the Automobile Club of America, are always practical and conservative. The following are a few rules he wishes to have established:

First—Let every driver of a car receive a certificate or license from the Secretary of State. On conviction, in addition to other penalties, for a first offense, let the certificate be revoked for a period of fifteen days, the trial magistrate indorsing on the certificate such revocation. For a second offense, a revocation of thirty days, and for a third offence, a revocation for one year and imprisonment. For the rich owner to be deprived of the use of his car in this way would be most humiliating. Every driver of a motor car realizes that the chief pleasure of motoring is in driving one's own car. The rich culprit would be exceedingly careful not to lay himself liable to a second or third conviction. In the case of conviction of a reckless chauffeur he would be out of employment, and his means of livelihood taken from him, so that he, the most prolific source of trouble, would have strong reason for not getting into difficulty. The sentiment of the entire community would back up such a law as this.

Second—Public garages should be under the supervision of the law.

(a) They should be required to take out a license.

(b) To keep a record of each machine,

showing the exact time it was taken out and the exact time it was brought back.

(c) The duplicate of this record should be furnished the owner of the car once a week.

(d) To allow no machine to get out without written order from the owner.

Third—Concerning chauffeurs, the following requirements:

(a) To take out a license.

(b) To keep a record of the car when it leaves and when it returns to the garage.

(c) Notify the owner of the car immediately when it becomes disabled.

Fourth—All cars above 5 H. P. should be required to have two separate brakes, one of which should be double-acting.

Fifth—No car should be permitted to run with muffler open in the corporate limits of a village, town, or city.

Sixth—The speed within corporate limits should be twenty miles an hour, and thirty miles an hour in the open country. But no speed should be allowed greater than is safe and consistent with conditions of traffic on the highway.

Alcohol Test

An interesting test was made with a Pierce-Arrow car last month, under the supervision of Mr. David Beecroft, the well-known auto expert. The trip was made from Chicago to Cedar Lake, Ind., with seven and a half gallons of alcohol. The engine started off on the spark and only stopped once on the road, when a cotter pin dropped out. A quarter turn of the crank started the car, which was one of the forty-five horsepower cars. Besides Mr. Beecroft, four other passengers went on the trip, and they were unanimously of opinion that the motor ran steadier and softer on alcohol than it did coming back on gasoline. The engine could not be made to pound as it could with gasoline.

The test was in every way eminently satisfactory. The car was kept at a speed of twenty-five miles an hour, and the speed increased in hill climbing. No odor was discernible at any time. The only changes made for the alcohol trial were to raise the float of the carbureter about a quarter of an inch, while the auxiliary air pipe was reduced about one-half. It may be noted that alcohol can be procured in Europe at seven cents per gallon, and it is expected that in a short time alcohol can be produced in America at ten cents per gallon.

A WARM WINTER RETREAT.

Ocean Motor Boat Race

A motor boat race will be run in June next from the station of the Motor Boat Club of America, on the Hudson, to the Bermuda Islands, for a trophy to be presented by James Gordon Bennett. Some of the conditions specified are as follows:

It shall be open to sea-worthy motor boats, measuring not less than 39 feet or more than 60 feet over all, being substantially built and fully decked, with motor power and living accommodations housed in, and equipped with all tackle and appliances necessary for a long passage in open water. Any form of internal combustion motor may be employed for propulsion purposes. The fuel carried must be sufficient to complete a distance one and one-half times that between New York and Bermuda. No ingredient shall be used to increase the power of fuel. The boats must be equipped with suitable spars and rigging to carry sufficient sail to give them steerage way in an ordinary breeze. The total area of canvas must not exceed 6 square feet for each foot of over-all length, but such as is carried may be in any form desired. A steering sail and storm tri-sail may also be carried Some person ought to arrange for an automobile race in Bermuda at the time the motor boats arrive.

Electricity in Mining

One of the striking results of the utilization of water power for the development of electricity to drive machinery is seen in mining districts where the absence of fuel has long presented an obstacle to the economical employment of steam. A wonderful change is reported to have taken place in this respect during the past year or two in Mexico. In the state of Guanajuato the increasing cost of fuel had rendered impossible the further mining and milling of many grades of ore, which are now again profitably worked with the aid of electric machinery, actuated by the water power obtainable in the neighborhood. The fact that electric power can be transmitted a long distance is also taken advantage of in

well-wooded districts, where the fuel is burned on the spot, and the resulting mechanical power is sent by cable to the mines.

Cutting Off Cape Cod

An important improvement in facilitating transportation between great centers of population likely to be carried out soon is the cutting of a canal through the neck of Cape Cod, or Barnstable Peninsula. This is a great sand cape that stands out like a huge nose from the coast line between and causes vessels plying between New York and Boston to make a long detour into the stormy Atlantic Ocean. Rounding that dangerous cape has cost many thousands of lives. The canal that ends this source of danger is only ten miles long, through sand very easily excavated. It is by no means creditable to the rich State of Massachusetts that this obstacle to water communication between two of the largest cities in the world should have remained intact so long.

Exchanging Club Courtesies

The touring automobile and the cruising yacht are the nearest approach to each other for sea and land sport and pleasure. The owner of a crusing yacht who is a member of a recognized yacht club has the privileges of the anchorages and the clubhouses of yacht clubs of a similar character along the entire coast. At the commencement of each season a neatly engraved card is sent out from each club to all the other yacht clubs along the coast, stating that the privileges of the club are extended to the members of the other clubs. These cards are posted in the respective clubhouses and the members make a list of the clubs which have extended their privileges to them. Thus, if a member of the New York Yacht Club puts in at Newport or some other New England port where a yacht club exists, he presents his card of membership in the New York Yacht Club and is permitted to use the anchorage and house of the club in that port.

This idea would be an excellent one if adopted by country clubs in which so many members are owners of touring automobiles. If such a practice existed a gentleman could take his friends out through the country, stopping at the various country clubs and having the privileges of the garage and table. It would not follow that he would have the privileges of the golf links, tennis courts or anything of that kind, but he would have the advantage of being able to put his machine where he would feel that it was safe, and would receive careful attention. He would also be able to entertain his party at the country clubs instead of at roadside inns. This would bring in considerable revenue to the clubs, and so long as each club had the privilege of saying with what clubs they would exchange these privileges there would be no danger of undesirable visitors.

When the aeroplane becomes a machine of daily use this interchange of club courtesies will be an absolute necessity. Therefore, why should it not be taken up now when touring automobiles take their owners to such distances that it is impossible for the owners to belong to all the country clubs within the radius of their possible operation?

A Wild Ride

Policemen should think twice before halting their foaming steeds in front of flying automobiles the way that Mounted Policeman Markey did one day last month on the West Drive in Central Park, New York. It appears by the police reports that Mr. L. J. Henes was driving in a sleigh in which were four men and two women. An automobile, the chauffeur of which had evidently been experimenting with alcohol, came zig-zagging along, and struck the sleigh with great force, upsetting the party. The chauffeur of the erratic motor car never stopped to ask how they liked it, but, increasing his speed, kept right on. When Markey galloped to the rescue and halted in front of the fugitive car, the machine came right on, and horse and rider were dashed aside into a friendly snow bank. Fortunately neither horse nor rider nor occupants of the sleigh were seriously injured. When last seen the automobile was heading for the high cliffs near Washington Bridge on the Harlem River.

An Ubiquitous Interview

The Press Bureau that worked up publicity for the Grand Central Palace, New York, automobile show, interviewed the editor of THE AUTOMOBILE MAGAZINE on his impressions of the exhibit and we find that other publicity managers are using the same interview for other shows. Here is what is going the rounds as an ubiquitous interview.

"The standardization of automobile construction is in sight," declared Angus Sinclair, the eminent authority on mechanical engineering, who was a visitor at the show yesterday afternoon. "Slowly but surely the manufacturers are settling into established forms. Mistakes of the past have taught their lessons, and we are coming to an era of interchangeable parts which will bring with it high class cars at moderate prices."

Mr. Sinclair is one of the experts chosen by the United States Government to inquire into the utility of denatured alcohol as fuel. He has had many years of experience with both locomotive and marine engines. Of all the recent inventions on exhibition in the show, Mr. Sinclair considers the rotary valve devised by the designer of the Duryea car as the most advanced step of any.

"I have seen many rotary valves, but none which combined simple principle with utility as this does," said Mr. Sinclair. "It has a long bearing and is free from pressure. It consists of a hollow cylindrical plug, in which there are ports, or cavities, for admission and release of gases. I believe it solves the problem for inlet and exhaust valves, which are so easily pounded out of shape. Wear is reduced to a minimum. One of the valves retained the original tool marks after it had been run over 10,000 miles."

Gas Engines for the Navy

In a paper read before the Society of Naval Architects and Marine Engineers, by Arthur T. Chester, on "Explosive Engines for Naval Purposes," strong ground is taken in favor of gas engines. The most salient points in the paper are:

1. Considering coal as the fuel used, an explosive engine connected with a gas producer can (and this has been thoroughly demonstrated) generate one horsepower on from 0.8 to 1 pound of coal per hour. A marine steam engine that can generate a horsepower-hour on from 2 to 2.5 pounds is a very efficient one. Thus we can rightly assume that, with the same amount of coal, an explosive plant will carry a vessel 2½ times as far as a steam plant.

2. A liberal allowance will give 100 pounds of weight of machinery and producers for each horsepower generated by a gas engine, and 150 pounds per horsepower is down to warship figures for steam plants. We therefore have a saving of 50 pounds per horsepower when using gas instead of steam. This saving in weight will allow a corresponding increase in fuel capacity.

3. When a gas engine is connected to a producer, the gas is generated by the suction of the pistons and so is not formed until needed. When the engine is not in operation the fires in the producers simply smoulder, consuming a very few pounds of coal a day. We therefore see that the necessary expenditure of coal in bringing steam up to the working pressure, in letting fires die down when coming to anchor and holding them in readiness, by banking, for service on short notice, is practically eliminated in the gas engine plant. This saving must be considered under radius of action, as it allows a vessel to remain longer in active service without recoaling.

Seventh Annual Motor Car Exhibition at Chicago

Everybody expected that Chicago would put forth a great effort to make the seventh annual motor show memorable. To say that it surpassed expectations is but to echo the opinions of the assembled experts. The great Coliseum, together with the Annex and the First Regiment Armory, were artistically prepared for the purpose of displaying the motor cars in all their resplendent perfection of engineering art. The general decorations comprised colonnades of fluted columns that had all the massive splendor of chiselled marble. Interspersed at intervals were colossal plaques of Mercury winged for flight. Mercury has properly become the symbol of the motor car, and the fleet-footed messenger never looked brighter than at Chicago. Other allegorical figures, representing Commerce and Industry, were scattered at intervals. The intervening decorations were a series of touring scenes representing motoring in different countries. These extensive paintings were of superior excellence and vastly different from what are usually seen in the way of decorations at exhibitions. The folds of green drapery, with the elegant signs in scarlet and gold, interspersed with a luxuriant wealth of red, white and blue canopies that stretched from column to column, gave a brightness and richness to the show, or, rather, to the three shows, that was a pleasing contrast to some of the sombre trappings that have marked other shows.

Turning to the automobiles, it would be absurd, of course, to expect anything particularly new in point of mechanical engineering, but it must be admitted that the setting was new and the committee, under the general management of Mr. Samuel A. Miles, are to be congratulated on the fine taste displayed and the excellent grouping of the exhibits. There were no evidences of manufacturers being allowed to swallow up large spaces for the evident purpose of crowding out less ambitious rivals. The spacing was exact and harmonious, and while much was necessarily crowded into little space, the most artistic eye could not possibly be offended, as all were in fine order. Much surprise was expressed at the completeness of the details at the opening of the exhibition. It is to be hoped that this lesson given by the promoters of the Chicago show will not fall upon inattentive visitors, who may be interested in future shows. Nothing detracts more from the artistic opening of an exhibition than that the first expectant throng of visitors should be rudely jostled by draymen delivering the exhibits or squads of workmen, apparently members of the Street Cleaning Department, with all their implements at work on the unfinished and ill-prepared assortment of unset exhibits.

The Chicago show looked as if it had been there a long time. The gentlemanly committee were also much in evidence. There were no star chamber officials hid away in cellars or garrets. The committeemen were on the main floor nearly all the time, and Mr. Miles and his accomplished assistants were within easy reach of the humblest visitor. Of the cars exhibited there were 360, of which not more than a dozen were foreign cars. No other show in America has placed more than 250 motor cars before the eye of a discerning public. So, in point of numbers, the Chicago show is decidedly the most notable event of its kind. It may be noted that nearly 700 cars were exhibited in Paris and over 580 in London last year. A marked feature was the increase of the number of six cylinder cars, and it might be added that the one and two cylinder cars are becoming less and less in evidence at these exhibitions. There is not, however, any evidence of a general trend toward six cylinder cars, the four cylindered engine seemingly meeting the requirements of gasolene motors. The most notable characteristics were the general approach to the exquisite finish, on which the French car manufacturers plumed themselves for a number of years. Now their best work could not be distinguished, and when the French and American cars are placed side by side, he would be an expert indeed who could point out wherein the superiority of one or the other consisted. The galleries were decidedly more attractive than anything we have ever seen in the way of accommodation for accessories. The many columned porticos, the white splendor of the intricate tracery of the marble decorations, the looped and festooned drapery, the gorgeous paintings set in magnificent framings, the rich draperies, the exquisite upholstery and the massive furniture gave the exhibitors a setting which was certainly taken full advantage of in displaying the finished products that glittered and gleamed in every section of the great galleries.

In the centre of the Coliseum, near the gilded roof, a great air-ship swung and rocked as if at anchor, and seemed projecting itself into the undiscovered future. We are all looking for it to take flight, and when it does wing its unerring way from continent to continent we will not be greatly surprised. We are getting accustomed to the contemplation of its aerial journeying and already see ourselves winging from zone to zone. In the meantime we will continue to make such short trips as we must needs make in one of the finely upholstered automobiles. In this particular the superb finish of the machines was the theme of universal admiration, and it would seem at first glance that it would be almost a pity to expose such finery to the biting winter wind that fairly shrieked from some glacial cave in the white north, and after howling over the frozen waters of Lake Michigan, struck Chicago with a bitter blast. The upholstery, however, was weather proof, as could be seen by the busy throng outside, who defied the elements and went flying along the far reaching avenues in the splendidly equipped cars, while the clever demonstrators explained the fine features of the machines.

Of the throngs it may be stated briefly that in point of popular favor Chicago far excelled any record made at the previous

EXHIBIT OF THE AEROCAR COMPANY AT THE FIRST REGIMENT ARMORY.

exhibitions. The severe weather did not seem to have any deterring influence. The three exhibitions were crowded, and in the evenings especially it was with difficulty that the interested spectators could move from place to place. The success of the exhibition was in every way particularly marked, and there are certain indications that point to Chicago as becoming a great centre of the growing industry that has in a few years made such splendid exhibitions possible.

Federal Regulation of Interstate Automobiling

Several months ago President Wood, of the Automobile and Motor Club of New Jersey, made a strong argument in favor of the United States Congress passing a law which would regulate the movement of automobiles traveling in states other than those where they belong. Mr. Wood's efforts appear to be bearing fruit, for several other clubs have taken up the question and are demanding Federal action. One of the officials of the A. A. A. is quoted as saying:

A campaign for a Federal law requiring uniformity in state statutes regulating the registration and use of automobiles will be the chief policy of the American Automobile Association in 1907. This is a consummation that has been desired devoutly and profanely by all motorists, and one that should receive more hearty commendation and more general support than anything else the national body could undertake.

It is of greater interest because this policy is that of Judge W. H. Hotchkiss, the prospective president, and its success therefore is to some extent assured. The new policy should cause a rally of individuals to the A. A. A. standard.

Wants Instruction in Road Making

A correspondent has written to us urging that we advocate the establishing in universities of a department for instructing people on how to make and maintain good roads. This is a subject well worthy of much greater attention than it receives, but we hardly think that college teaching would do much to promote the art. The world has been building roads so long that it would be difficult finding anything new or valuable to tell about it; moreover, road building is taught in engineering colleges.

The fact is that the general extension of good roads does not so much need instruction of how to build and repair them as it does the cultivation of a sentiment calling for the expense of road building being carried by the people at large. The United States Government has in the past done a little to aid in the construction of good roads, and the indications are that much more will be done in the near future. As a whole the highways in the United States are inferior to those of any other civilized country, but that has happened through the burdens of road making being badly adjusted. The roads have been built and maintained at the expense of the rural communities, while towns and cities have enjoyed a large share of the benefits they did not help to pay for. If the expense of the works were only forthcoming, there are plenty of engineers among us quite competent to see that the road construction shall be performed after the most approved methods.

Seats for Machinists

It seems to shock the prejudices of an old machinist to see people gravely recommending that a machinist should be provided with a seat to grace while doing his work. Yet that seems to be a growing fashion. A machine shop foreman writes to the American Machinist:

"All those in my department are allowed stools and they use them whenever the work will permit.

"I began by stopping at each machine a few moments every day and getting acquainted with the men, their likes and dislikes, their ideas as to how the tools were working and improvements that some thought could be used to advantage. In the evenings I went to each one before the bell rang to quit and inquired how they were feeling. Some would be pretty tired, others were about ready for their supper and a few were thinking of the good time they would have that night at some party or dance.

"Two of the men were running machines which required the use of both hands continually turning the handles, and of both feet to brace themselves, both being in a standing position. After pulling those handles around all day and having the weight of their bodies to support also, these two men were quite tired when night came.

"After watching them for some time I decided to try stools for those machines as well as for the others. I asked them what they though of it, and they replied that anything which would not make the work more difficult to do would suit them.

"I explained to them that I thought a stool which was just high enough to allow of their weight resting on the edge of the seat, so that they could just reach the floor and have sufficient weight on their feet to properly brace themselves while operating the machines, would be just the thing and that because of their not having to support the weight of their bodies all day, they would not be so tired at night.

"I never saw men more pleased than were those fellows after they had used the new seats and found how much they helped them in getting their work out. They both turned out about 10 per cent. more work and felt betetr for it as it was the means of my getting them a raise in their wages."

An Exciting Chase

Mr. J. B. Eccleston, Secretary of the Centaur Motor Company, of Buffalo, had a novel experience early in February. While spending an evening in the rooms of the Buffalo Automobile Club his big touring car was stolen from the front of the building. It was nearly midnight when the loss was discovered. Mr. Eccleston and a detective started out in another car to look for the lost car. About 3 o'clock in the morning they spied a lone machine moving along Genesee street. They hailed the driver, who was alone, and who immediately put on full speed. Fortunately the great highway was clear and the thief, like the captain of the schooner "Hesperus," steered for the open sea. The cars were finely matched, but after a few miles had been reeled off a mounted policeman loomed up in the wan moonlight, and the thief shut off the sparker. Coming to a standstill he vaulted over a high fence, but the policeman's horse was in fine fettle and took the bars like a Madison Square Garden champion. The thief had another good start, but it was no use. The fiery steed was up to him and a gleaming revolver brought him to a halt.

Gilded Lead Prize Medals

When rogues with "Exposition" stamp upon them patronize the gold brick industry and send out gold medals made from cheap alloys, they had better send none of them to a mining town. The other day a resident of Butte, Mont., received the St. Louis Exposition "gold medal" awarded him for an exhibit he had made there. He thought the medal was off weight for a gold one and had it assayed. The assayer found there was not a particle of gold in it. It was a composition of copper and zinc.

It is said to be a certainty that a bill will be introduced in the Florida legislature next winter providing for the utilization of prison labor of the State in road building. There is no State in the Union that good roads means so much to as it does to Florida, and it would mean that the State would each winter become a great driving ground for automobilists and the drivers of horses.

The principal auxiliary of trade is advertising. It is not always the newspaper with the largest circulation that exerts the widest influence and brings the best returns. Advertisers should not overlook the fact that publications having a reasonable circulation among a good class of people bring better results than a publication that has only a reputation for a large circulation.

Autocars of 1907

The 1907 Autocar product consists of two cars—Type XIV, 30 horsepower touring car, and Type XV, 12-14 horsepower runabout.

The Type XIV touring car illustrated is a large, luxurious, easy-riding machine, with long wheel base and ample motor power.

The Type XIV motor is four-cylinder vertical, water-cooled, located under hood. Bore, 4¼; stroke, 4½, which actually develops 30 horsepower. Cylinders cast separate; heads, water jackets and exhaust valve chambers integral; cylinders, piston and rings ground to size. Large mechanically operated inlet and exhaust valves.

Inlet valves placed at the top of cylinder and directly over piston chamber, insuring complete filling of cylinders at all speeds, giving maximum results of motor under all conditions.

Water jackets cover entire heating surface of cylinders.

Both inlet and exhaust valves are operated by one cam shaft; the lifts are provided with large rollers, which shaft and pump shaft gears are at the forward end of crank case, fully enclosed and run in oil.

Lubrication is effected by a force feed oiler, with individual pump for each lead pipe. One lead pipe to each motor bearing and a separate pipe to crank case to keep the splash level; the connecting rods, cams, and cam shafts being oiled by splash. Oiler is placed inside of hood, on dash with sight feeds only visible from the seat of the car.

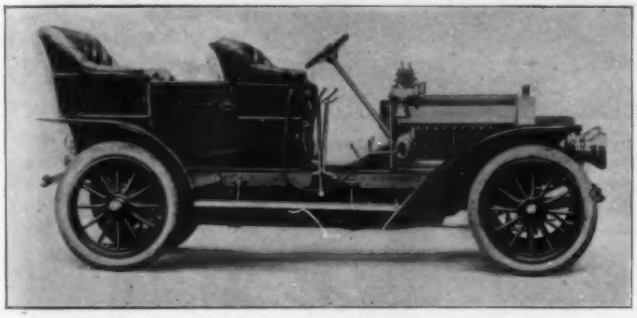
The motor, flywheel, clutch and transmission are contained and enveloped in a special aluminum case of high tensile strength, bolted together and supported as a unit at three points. Two points or legs from the motor to the frame and the third point under the transmission, being seated on a stiff spring, thus permitting us to do away with the heavy sub-frame construction.

In adopting and embodying the three-point suspension of our 1907 product, the makers through the perfect alignment of all component parts, and to deliver the rated horse power to the rims and emergency brake lever are on the righthand side. The clutch is operated by a foot pedal, as is also the service brake. The emergency brake first throws out the clutch, disconnecting the power of the engine from the rear axle, before applying brake. Irreversible wheel steer on the right hand side, with worm gear and sector.

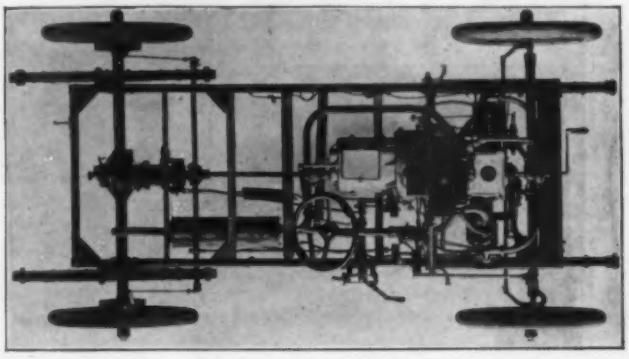
The rear axle is of the live type, and is of steel, encased in a seamless tubing and ground to size. The wheel ends of the axles are squared, and fit the squared openings of the hub, doing away with the use of keys and eliminating any possibility of trouble at this vital point of drive. Four sets of roller bearings, in connection with large ball thrust bearings reduce friction to a minimum. The rear axle tube is securely fastened to the frame by two radius rods, which relieve the springs of the drive of the car. The bevel gears and differential gears are entirely housed and run in oil.

The carbureter is of the Holly type.

Ignition is by jump spark and storage battery.



THE AUTOCAR TYPE XIV.



AUTOCAR TYPE XV CHASSIS.

insure long life and little friction. Adjustment of exhaust valve is by cap screws, which screw in the plunger and are held in desired position by lock nut.

Crank shaft is a weldless steel forging, oil tempered, with large flange for bolting on flywheel. Flywheel can be easily removed and replaced with little trouble and no danger of becoming loose or running out of true.

The crank shaft has three long four-stud bearings. All bearings split provided for adjustment and taking up wear. The upper crank case is made of aluminum alloy, of high tensile strength, and all bearings are bolted to upper half. Lower half of case is made of aluminum alloy, and can be removed without disturbing any other parts. Crank shaft and pistons can be removed without removing cylinders. Upper half of crank case is provided with two large openings, through which all adjustments may be made without removing lower half of case. Cam of the rear wheels with the smallest possible loss by friction of the actual horse power developed. The three-point suspension of motor, flywheel, clutch, and transmission makes it impossible for any unevenness in the road, or the action of the car on its springs, or even any variation in the frame, to affect their alignment with each other, or with their component parts.

Transmission is of sliding gear type, with three speeds forward and one reverse; direct drive on high gear. Gears are solid drop forgings, of high carbon steel, oil tempered, with strong, broad faces. Shafts of high carbon steel and run on Hyatt roller bearings, of great length, insuring perfect meshing of the gears, and eliminating any possible wear. Gears run in a bath of oil.

Control is by throttle and spark which are regulated by grips on the rims of the steering wheel, giving the operator the use of both hands in case of an emergency. Gear shifting lever

Cooling is effected by a fine tubular radiator, and centrifugal gear-driven pump, supplemented by a fan back of the radiator. The large volume of water surrounding the valves also greatly assists in the cooling.

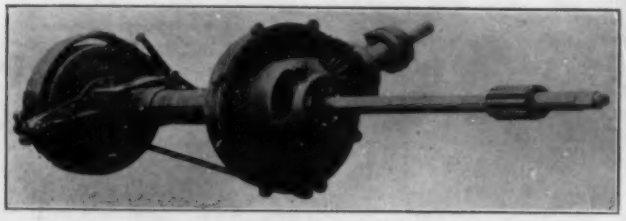
The gasoline tank is of 16 gallons capacity, and is constructed so that four gallons of gasoline always remin in reserve, and this reserve supply cannot be used except by turning an emergency valve. The reserve tank always filled first when filling the regular tank.

The "Autocar" patented floating ring, flywheel clutch is of metal to metal type—nothing to wear—never drags, making shifting of gears easy and noiseless. With the 'Autocar" clutch it is impossible to subject the car to a sudden jerk, so common in the cone and other types of clutches, but on the contrary, the "Autocar" clutch enables the operator to "pick up" the car easily and without jar, thus greatly prolonging the life of the entire mechanism.

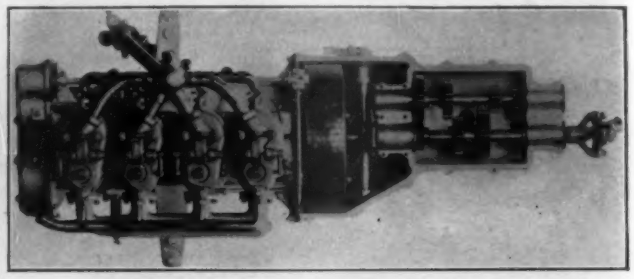
The universal joints are made of specially hardened steel, and are of unusual strength, though the duty imposed upon them is not as great as in most cars, owing to the nearly straight line from crank shaft to rear axle. The upper universal is a sliding joint, to allow for motion of the car on its springs. Both joints are completely housed and packed in grease, sufficient for a run of several hundred miles. Price, $3,000.

The "Autocar" Type XV runabout is the result of ten years' work in perfecting and refining ever the same principles of runabout construction. It is built of the same quality of metals and materials and embodies the same high grade workmanship throughout as our three thousand dollar car, and it is the only runabout with the sliding gear ball bearing transmission with three forward speeds and reverse, motor in front under bonnet and shaft drive.

The motor is two cylinder, horizontal opposed, water cooled, located under bonnet. Bore 4", stroke 4", which develops 12-14 H. P. Cylinder heads, water jackets and exhaust chambers, integral, cylinders, pistons and rings ground to size. Otherwise, engine is practically the same design and description as the four cylinder Type XIV motor. Price, $1,200.



AUTOCAR TYPE XIV AXLE.



PLAN OF MOTOR AND TRANSMISSION GEAR OF AUTOCAR TYPE XIV.

Unquenchable Stone

It is said that the Emperor Charlemagne had a table cloth made of asbestos, and that it was cleaned by being thrown on the fire and all the stains burned out. Prior to the year 1850 this substance was looked upon as a curiosity and was practically unknown in the arts.

There are two varieties of commercial asbestos, one known as Amphibole. This word comes from the Greek, meaning doubtful, as originally it was not known how it was formed. This substance is comparatively little used, as the fibers are short and without much tensile strength and therefore are not suitable for the purposes of manufacture. It is used to some extent in cements, but even for this it is not particularly well suited.

The other form of asbestos is called Chrysotile. This has a strong silky fiber. It is a variety of serpentine. The fibers are longer than those of the other variety, and Chrysotile lends itself readily for the making of such materials as asbestos fabrics, household utensils, theater curtains, clothing for firemen, etc. Just here it may be remarked that asbestos is a fire resisting material of high quality, but in the solid form can itself get very hot. When used as a non-conductor of heat it is generally in the porous form and the minute air cells which it then contains, as well as its own quality as a fire resistant, makes porous asbestos an exceedingly durable non-conductor of heat. In Germany, asbestos is called steinflachs (stone flax) and the miners of Quebec give it quite as expressive a name—pierre coton (cotton stone).

Asbestos is mined in open pits, similar to stone quarries, and although it is found in all parts of the world, the mines in the Province of Quebec in Canada are the most famous, yielding about 85 per cent. of the world's supply of Chrysotile. Probably the largest of these mines is that owned by the H. W. Johns-Manville Co., of New York. In 1879 the output of the Quebec mines was 300 tons, which has steadily increased year by year to 50,000 tons in 1905. Asbestos is sometimes called earth-flax and mountain-cork. It is the fabulous "unquenchable stone." This name is derived from the effects of water on quick lime, with which asbestos is often associated. The ancients, ignorant of the chemical combination which took place, wrongly ascribed the production of heat when water came in contact with lime to the presence of this unquenchable stone.

The Catskill Highway

The proposal to build an automobile highway along the line of the new Catskill Aqueduct continues to grow in popular favor. The cost would be comparatively small, while the objects attained would be of prime importance. As an object lesson it would doubtless be an incentive to other States to take up the work and it would thus be the first in what might become a network of national highways extending over the entire country. The Aqueduct route presents many advantages, both as to easy communication with the valley of the Hudson as well as to the picturesque scenery of the Catskills. The road would necessarily be free from grade crossings and would in all likelihood be divided into two courses, one for north bound and the other for returning cars. As an incentive to the multiplication of suburban homes and the increase of land values along the route it would undoubtedly be a great paying investment. The convenience it would afford to the suburban car owner and its advantages to the tourist would be immediately appreciated.

In Court

Chauffeurs are not having such an easy time as they had. Formerly when they took their employer or his wife home, the chauffeur would start out on a go as you please tour with his private friends. Mrs. Hermann Oelrichs had her chauffeur in court last month. For seven long hours she had waited for the coming of the wheels of her chariot. The widow of the multi-millionaire sat and waited while the electric wires were kept hot calling for the missing chauffeur. When Shaw, the chauffeur, finally drew his machine up to the curb of the palatial mansion it was the police station for him. In court Shaw rose to the occasion. He swore that after leaving his wealthy employer and her party the car broke down at a little distance and that he had labored six and a half hours to get it moving. He said that he called an engineer named Shotwell to help him, and Magistrate Wahle asked if he was "well shot." Shaw admitted they had been having some refreshment. Shaw could not furnish bail and was held for trial.

A Massachusetts road bill sired by Daniel F. Gay, of the Worcester Automobile Club, provides that the Mayor of a city or the selectmen of a town may in their discretion permit automobile speed races on State highways or specified portions of them during a certain specified time. To this end the Constitutional rights of the public must give way, the public not being permitted, during the hours such contests are being held, on the highways in question.

General Correspondence

Needs of the Patent Office

Editor AUTOMOBILE MAGAZINE:

American inventors are not only the most numerous of any nation in the world, but they are the most ingenious. In the atmosphere of American liberty there is encouragement for every honest effort in a laudable direction. Labor saving devices spring with mercurial swiftness into every channel of human endeavor. The rewards are very irregular and not in any sense in a ratio to the effort made by the inventor or the result accomplished. The invention may be of much real value to the community, but the crystallization of the appreciation of its use into concrete reward depends on other contingencies over which the inventor can have no control. The promoter must needs follow the inventor, just as the publisher follows the author, and the publisher is said by authors always to have the best of it.

Be this as it may, there is one real evil under which American inventors have long suffered and which time, that is said to have healing on its wings, only seems to aggravate. We refer to the delay which occurs in the United States Patent Office. At the present writing there are nearly twenty-five thousand applications awaiting action on the part of the office. There are an equal number of inventors all waiting, in many instances nearly a year, before an examination as to the patentability of their work can be begun. A report of the conditions of the Patent Office recently published establishes the fact that during the last seven years the applications for patents have increased seventy per cent, while the examining corps have increased only twelve per cent There is a double vision in this report showing the examiners must be working very hard now or they must have had a leisurely occupation prior to 1899. The latter is more likely the case, and we have no hesitation in stating that if the office were run on the same general principles as any well managed business establishment, much more work could be got out of the examiners. Work at the present time is said to amount to four examinations of claims a week. We are not alone in our opinion that this is not much for the money. In any event there is no good reason why the system of absurd and unreasonable delays should continue.

The inventors are not asking any favors. They pay well for the poor service they get. In the last seventy years the Patent Office has made a profit of over six millions of dollars. The present year will show a profit of over three hundred thousand dollars after paying all expenses. Why could not the force be increased? There is money enough to pay for one hundred and fifty more men to be added to the three hundred already employed. There is only one reasonable answer to this. It does not come within the scope or interest of any particular section of the country, and the inventors having no cohesion cannot maintain any "lobbyist" to promote their interests, and, as usual, what is everybody's business is nobody's business, and the matter drags on its weary way.

In our Patent Office Department in the pages of AUTOMOBILE MAGAZINE we have complained again and again. We are pleased to give voice to the voiceless who are enduring real injuries. We know something of what American ingenuity has done in perfecting the mechanical appliances used on railways, and we are not without hope that our voice has not been altogether like a voice crying in the wilderness. Indeed we are much pleased to observe that a Patent Law Association, of which Mr. A. V. Cushman is secretary, has been established in Washington, having for its object the betterment of the Patent Office service. It becomes the inventors and manufacturers of America to sustain and uphold this association. In their interests it has been begun and in their interests we hope it will be carried on until Congrees shall see fit to apply some of the funds which come from the hands of our inventors and not only reorganize the Patent Office system but erect a Patent Office building which shall be worthy of American Inventive Genius.

ROBERT BAILEY.

Speed Limit

Editor AUTOMOBILE MAGAZINE:

The recent contests on the Florida coast have demonstrated that the speed limit has been reached. The fact that the records this year were not quite up to those of last year will not be taken as proof that they may not be surpassed at some future trial of speed, but two miles a minute is surely a degree of velocity in locomotion that leaves nothing to be desired. There is no likelihood of ordinary mortals, no matter how intense their love of swallowing up mere space may be, ever feeling a pleasure of moving at more than half this speed. It is a terror to look at, and while few have experienced the sensation of travelling through space at a velocity of nearly 100 feet per second, the accounts given by the survivors are not pleasant. The subject need not be pursued further, as it must be idle to encourage the mere element of speed, when it is contrary to law and reason that any such speed can ever be of utility in the practical use of the automobile. In this regard there is a feeling of growing antagonism to cars that are of freak construction and are literally useless except as racing machines.

It may be noted that among the bills that have been brought before the various legislative committees some have been aimed at the proposition that machines should not be permitted on the public highways that are capable of running at a greater speed than the legal limitation. The absurdity of this proposition is apparent when we remember that the State laws vary from each other so intermittingly that the autoist would require to procure a new machine as soon as he crossed the imaginary political boundary line of the states. This brings us to the conclusion that laws affecting the use of the highways should be national in scope and essence, but as this may seem to trample on the sacred rights of the states about which so many bitter quarrels have been fought, we can not do other than hope that the strong common sense of the American people will eventually manifest itself in the fact that there is no need of special automobile legislation. The laws in regard to vehicular traffic generally have been found sufficient to meet the needs of the situation and undoubtedly the present absurd and complex laws affecting the use of the automobile will gradually disappear.

Probably the most promising measure under discussion is that proposed by Mr. C. T. Terry, chairman of the law committee of the American Automobile Association, who has proposed a national law which will eliminate many of the difficulties under which motorists now suffer in touring from one State to another. The bill is expected to come up at an early date and among other matters will undoubtedly deal with the important question of the speed limit. A. B. THOMSON.

Newark, N. J.

Parasites

Editor AUTOMOBILE MAGAZINE:

I bought an automobile two years ago, and being a doctor in a suburban town I have found the car very convenient and much less difficult to manage or keep in running order than I had expected. But of late I have been think-

ing that the owner of one automobile has to pay in various disagreeable ways for the luxury of keeping a horseless carriage. Scarcely a mail arrives that fails to deliver a bundle of circulars and letters urging me to purchase things that an automobilist has no need, but which are persistently pressed upon him. Then there are associations without number that he is urged to join and intimations are plainly given that he may save himself lots of annoyance by becoming a member.

It seems to me that an automobilist is like wounded deer I have seen in South America, a flock of birds of prey hover round him ready to grasp a mouthful. In no other line of sport or luxury have I seen the flock of cormorants hanging about that are constantly victimizing automobilists. There are associations, societies, clubs and agents without number that make automobilists their prey. Please ask those parasites to let us alone for a brief season. LONG ISLAND.

A Real De Luxe Car

Many so-called de luxe automobiles have made their appearance during the past year, but it has remained for the Ford Motor Co., of Detroit, to build the real thing in a light runabout. This new car, known as Model R, is a four-cylinder edition de luxe of the famous Model N, and made its first appearance in Detroit last week at the private show held by the Ford Motor Co., at their retail store on Jefferson avenue.

This company is also making a six-cylinder forty horsepower runabout, which will make 70 miles per hour, and be sold at $2,800. Raising the price of the four-cylinder runabouts to $600 has not diminished the number of cars being sold daily, and the factory is being worked to its full capacity to fill orders.

Automobile Accidents

Sergeant Elliott, of the Chicago Police Department, has been keeping an account of the deaths caused by moving vehicles of different kinds in Chicago and finds that during seven months of last year the casualties amounted to 425, while 4,535 sustained injuries. Of these the street cars killed 75 and injured 1,524; railroads killed 158 and injured 420; teams killed 89 and injured 642, while automobiles killed 7 and injured 85. It will thus be seen that among the 2,000,000 of Chicago's population, while 425 met their death by vehicular accidents, less than 2 per cent. of that number was caused by automobiles. Anyone reading the records of the daily press would think that the reverse was the case and that the balance of 98 per cent. of deaths was caused by the automobile. This remarkable perversion of the actual facts on the part of the public press is one of the peculiarities attendant on the introduction of anything new whereby accidents may naturally be looked for. One would expect that the intellectual training necessary to equip the editor of even a country weekly would enlarge his mental vision sufficiently to grasp the simple figures as illustrated in the report from the Chicago Police Department, but the weakness among many members of the press is that it is not facts that are looked for. It is sensationalism. It is perverted appeals to the imagination whereby the judgment of the readers is misled, and a real injury is done to a great and growing industry.

It seems remarkable that every important invention has to pass through this cruel and unnatural persecution. The art of printing was said to be the work of the devil. Parliaments had to be bribed and coaxed to permit the laying of rails for the locomotive. Horror and amazement cried out when Robert Fulton brought a steam engine from Britain and placed it in a boat and steamed up the Hudson. Now an accident befalling to an occasional automobilist is magnified into a national disaster, and the cry of the daily press goes up like Rachel weeping for her children and refusing to be comforted.

The unnecessary anguish is not the only evil feature in this absurd distortion of facts. The pernicious element of distrust created in the minds of the public has its reflex in the hesitancy with which intending purchasers decide on making a contemplated purchase. Not only so, but it is generally found that a large class of people have a rooted prejudice against the use of the machine, and while this feeling is gradually dying out, it still lingers with something akin to the feeling which we nearly all have now at the idea of venturing ourselves into a balloon. When the automobile assumes its proper place as the greatest medium of locomotion, it will not owe its popularity to the daily press, but it will have reached its proper place in spite of the pernicious influence of a debased and misleading press. Meanwhile the amusing spectacle of the automobile manufacturers squandering their money in lavish advertisements in the daily press is witnessed, while the columns of the same papers are used in a vain effort to retard or destroy a great and growing industry.

Testing a Maxwell Car

Few motorists ever put their cars to the strain that the modern machine undergoes before leaving the hands of the testing-out man at the factory, where it is made. The illustration shows a Maxwell car in the course of a day's testing, on the historic ground that surrounds the Tarrytown (N. Y.) factory. Each car is required to do the tremenduously rough work that bumpy fields, rocky roads, fordable streams and spring-trying ditches provide, before the chasis goes to the finishing department for shining paint and a comfortable body.

TESTING OUT A MAXWELL NEAR THE TARRYTOWN (N. Y.) FACTORY.

St. Bernard, who was a wise man, said that "Nothing can do me damage except myself; the harm that I sustain I carry about with me, and am never a real sufferer but by my own fault." The scorching automobilist cherishes sentiments that are quite the reverse of that, Barney. Their happiness is in making other people miserable.

EUROPEAN NOTES, NEWS AND COMMENTS

By A. F. Sinclair

Making Motor Car Racing Track

There is at present under construction, as mentioned before in these notes, a motor-car racing track on Broadlands estate, near Weybridge, about twenty miles southwest of London. The track will be about three and a half miles round and one hundred feet wide. Work is going on very actively at present and strenuous efforts are being made to have the whole complete by the beginning of May, but it is very doubtful whether this will be accomplished. Meanwhile a Broadlands Automobile Racing Club has been formed, with an influential directorate, who, if social standing goes for anything, should make the thing a success. Unfortunately for the promoters something more than a mere position in society is required, but should the directors be fortunate in their choice of a manager the enterprise may turn out a financial success. They started out badly by issuing rules and making provisions in matters of detail on purely horse-racing lines. Now, people interested in motor-car performances do not, as a rule, take much interest in horse racing, and if the converse should be the case, and the races depend solely on people interested in motoring, the profits derived from the undertaking will scarcely be alarming. The track is to be opened by that enterprising business man and motorist, Mr. S. F. Edge, who, ever on the *qui vive* for a good advertisement, will endeavor to break the world's record for a twenty-four hours race against the clock. The last attempt of the kind was made on an Indianapolis track a couple of years ago, the distance covered being just over 1,094 miles in the twenty-four hours. Edge will drive a 60 H. P. Napier and hopes to maintain an average of 60 miles an hour. Besides this opening event all sorts of matches, races and competitions are in the air, and whether the events are patronized by the betting public or not—their absence would be welcome but for the gate receipts—the track itself will be well patronized.

The Thomas Workman

A good deal of quiet amusement has been caused in motoring circles in Europe over the arrest of the Richard-Brasier men who crossed the Atlantic under contracts of labor with the Buffalo company. The general impression is that Mr. Thomas deserved to be rewarded for his enterprise rather than that the skilled mechanics should have been liable to punishment. It would be useless to deny the great skill of the French artisan so far as motor-car manufacture is concerned, the great reliability of French racing cars, and their general success being due as much to the thoroughly efficient workmanship of the mechanics as to the designs of the drawing-office staff. The Belgian, German, and Italian sections of the industry, specially the last, have all succeeded by seducing the best French workmen and draughtsmen from their homes, and even in Britain they have been called upon to some slight extent. Our experience is that they turn out the very best work, but that they are slower and less gifted with initiative than the British mechanic. There is not the slightest doubt that the success in recent years of the Fiat and Itala cars in racing, resulting in the rapid expansion of the Italian industry, the fine design and consequent good selling qualities of the Martini (Swiss), Benz (German), Metallurgique (Belgian), Biancki and Isotta-Froschini (Italian) are due to the work of imported French designers and workmen. That such importation has been of first-class importance to the companies concerned and indirectly of benefit to the native workmen in these countries is beyond dispute. Why, under like conditions, the United States should be precluded from the benefit of such imported skill is one of the puzzles which a native of these islands has a difficulty in understanding. One can appreciate the objection which would exist to the importation of "blackleg" or "scab" laborers in the case of a dispute, but it is a different matter when men are imported to act as teachers of the native workmen. Perhaps the latter resented the implied superiority!

MAKING AN ENGLISH RACING TRACK.

Denser Fuel

The Motor Union of Great Britain and Ireland, to give the body their full and unabridged cognomen, have at present a committee engaged in the investigation of the ever interesting fuel question. Some time since Dr. Paul Dvorkovitz, the editor of the *Petroleum Review*, gave evidence of a very interesting and very important nature. The essential point of his evidence was that provided motorists forsook the specific gravity fetish, and started in to worship the boiling point of petroleum spirit as the standard of quality, there would exist not the slightest danger of any shortage of fuel. He maintained that the erroneous belief entertained by motorists that the specific gravity of petroleum spirit had everything to do with its vaporizing tendency was probably a legacy from the days of surface carbureters, and he held in effect that better results would be obtained from spirit up to .760 S. G. than from the .720 quality presently in use. If such spirit were generally adopted by motorists not only would there be no difference in the facility of carburation, but there would be an increase of about eight per cent. in the engine power. That advantage would be, however, of secondary importance to the vastly increased supply of petroleum spirit. With the present quality of gasolene, or petrol, as we call it, only about

10 to 12 per cent. of the crude oil is used, but if the denser form were accepted a very much greater percentage of the crude oil would be available. At the present time the source of the world's production is divided into two groups, one producing 40 per cent., the other 60 per cent. of the 40,000,000 tons of annual output. But only from the smaller group is petrol obtainable at present, because at the .720 standard the larger group's crude oil only contains about 5 per cent., which it would not be profitable to distill for. Now, if the standard of density were increased to .760, not only would the smaller group's percentage increase (another witness put it as high as 30 per cent.), but a large quantity would be produced profitably by the larger group also. It is an unquestionable fact that inasmuch as the denser liquid has a greater heat value, more power is developed, but equal facility of vaporizing is a quality yet to be proved.

DUBLIN MOTOR SHOW.

The Show Season

We are at present in the midst of a plethora of shows. They began on New Year's Day in Dublin, and will end about the middle of April. Scotland has three, two in Edinburgh and one in Glasgow. Other places are the Crystal Palace, London; Manchester (two), York, Sheffield, Birmingham, London, Olympia (industrial and heavy vehicles); Liverpool, Newcastle, finishing with the Agricultural Hall, London. Needless to say the whole thing is an unnecessary burden on the car purchaser, who must ultimately pay the piper. It is more particularly the Dublin show, the first of the series, to which I wish to refer. For generations Ireland has been the breeding portion of the United Kingdom, so far as saddle or carriage horses are concerned. From Ireland have come most of the animals for cavalry and artillery purposes, and one of the greatest events of the year in the Green Island is the horse show at Ballsbridge, Dublin. To this show a big portion of the well-to-do people in every part of the country flock, and the occasion is one for every sort of junketing and frivolity. It was in this high temple of equine worship, the Art Industries Hall at Ballbridge, that the motor-car show was held, and to anyone of a thoughtful turn who pondered over the new departure, the occasion must have given food for sad reflection. There can be no doubt that the general introduction of motor vehicles for pleasure and industrial purposes will have a prejudicial effect on the horse-breeding section of the farming community, and Ireland can ill afford to lose any source of profit. The show was probably the best to be held out of London, the hall being very suitable and the exhibitors not only numerous, but fairly representative. Not only were there English, Scottish, and Irish cars shown, but vehicles from the United States (Cadillac, Ford, Reo, White and Winton); France (Panhard, Gladiator, Delaunay, Brasier, Vinot, etc.); Germany (Mercedes); Belgium (Germain); Holland (Spyker), were also on view. Altogether a most interesting display.

Ideal Steering Gear

The steering gear is an intensely important part of an automobile, for a failure or fracture of any part may send the occupants of the car to their death. Some makers of automobiles are grossly careless about the steering gear, which is regarded of the last instead of the first importance. We consider the Knox car steering gear the best we have examined.

The worm is a quintuple thread, cut on the solid bar of high carbon steel, working in a hard babbitt nut five and a half inches in length, which is split and afterward bolted together. The threads of the screw are inclined and not square, as in the ordinary practice, and the worm has ball thrust bearings which permit adjustment and eliminate the lost motion apparent in the steering gears of most cars after protracted use.

Points In Gas-Engine Design Frequently Overlooked

BY E. W. ROBERTS, M. E.

The time was when any old thing in a gas engine made good so long as it would run. Now, however, it is found that the requirements are as rigid as in any other branch of engineering. In automobile engines, maximum power for minimum weight for the higher priced cars and simplicity for the lower priced cars are features that are demanded, and must be carefully looked after by the designer. The same is true to a great extent in marine engines. In large engines only does the question of economy become an exacting one, but in large marine and stationary engines it outweighs practically every other consideration.

In the present article it is my purpose to show by practical examples the kind of mistakes the average designer is apt to make, including those made by both inexperienced and experienced designers, and how to avoid them.

In the four-cycle engine, probably the mistake that I have most frequently observed is in the proportions of the valves and their accompanying parts. Few novices in gas engine design appear to realize the importance of this feature. I have found engines which fell short in power from valves being too small for the engine at its normal speed, valves with insufficient lift and valves poorly timed. By timing of a valve is meant the position of the crankpin at the time of opening and of closing the valve.

Let me first explain, briefly, the theory of valve proportions and timing. In the first place the engine must draw into the cylinder a change of air and gasoline vapor. It is obvious that the greater the quantity the more powerful will be the explosion. In the same interval of time more air will pass through a large hole than through a small one.

Don't forget that it is the pressure of the atmosphere that drives the air into the engine. So, when a certain size opening is reached the amount of air that will be driven through in a given time is very nearly a maximum. Hence there is a certain proportion of inlet opening beyond which it is of little advantage to go. Below this size, however, the inlet is said to be "choked," and the entering charge is "wire drawn" (pressure reduced by friction in passing through narrow channels).

This proportion depends not only upon the diameter of the piston, but also upon the speed of the engine. It is generally considered that the average speed of the air when drawn through the inlet passages should not exceed 100 feet per minute. The piston of a

reciprocating engine comes to a complete rest at the end of each stroke or twice for one revolution, and its speed is greatest at about the mid-point of the stroke.

The speed therefore that is used for a basis of comparison when proportioning a valve is not the greatest speed of the piston, but the average speed. The average speed is called the piston speed, and is the length of the stroke in feet times twice the number of revolutions per minute. Therefore if the average allowable speed of the entering charge is 6,000 feet per minute and the piston speed is 600 per minute the area of the inlet passages should be 1/10 the area of the piston. For the average automobile engine the piston speed is 800 feet per minute, and the area of the inlet passages should be 2/15 or .133 times the area of the piston.

A general rule would therefore be as follows:

Let a = the area of the inlet passages
A = the area of the piston
S = the piston speed in feet per minute

Then $$a = \frac{A\,S}{6{,}000}$$

The lift of the valve should be at least ¼ inch its diameter to make a free passage when the valve is wide open. Later I will give a simplified formula and tables of valve diameters.

Just as important as the area of the valve and the inlet passages is the timing. In a gasoline engine, wherein the gasoline is drawn in by a slight vacuum caused by the draft of the ingoing air, opening the valve after the suction stroke has begun is an advantage. This causes a rather sharp initial draft through the carbureter and is of assistance in picking up the fuel promptly.

Of still further importance is the time at which the inlet valve closes. In the earlier engines it was the custom to close the inlet valve just at the end of the suction stroke. As already pointed out, the piston is moving with comparative slowness near the end of the stroke. During the suction stroke, the column of air entering through the inlet pipe is under way and its momentum tends to keep it in motion after the end of the stroke is reached. Owing to the friction of the inlet passages the pressure in the cylinder at the end of the stroke will be below that of the atmosphere. This slight vacuum coupled with the inertia of the air column tends to make the flow of air continue after the end of the stroke is reached and until the returning piston overcomes it. Therefore more air will be drawn in if the inlet valve is closed late than if it is closed at the end of the stroke. The time of closing depends upon the speed and will be discussed later.

The exhaust passages are usually made greater than the inlet passages because the exhaust gases are at a higher temperature than the ingoing air, and in consequence their volume at atmospheric pressure is greater. It is customary, for convenience, to assume that the exhaust gases leave at atmospheric pressure and that they must not exceed a speed of 85 feet per second or 5,100 feet per minute. The formula for the area of the exhaust passages would therefore be:

Letting a' = the area of the exhaust passages

$$a' = \frac{A\,S}{5{,}100}$$

In timing the exhaust valve it is best to open the valve sufficiently early so that the pressure will drop to that of the atmosphere by the time the end of the stroke is reached. This avoids back pressure and consequent unnecessary work on the piston during the exhaust stroke.

As with the inlet air, the exhaust has some momentum when the end of the exhaust stroke is reached, and holding the exhaust open during a portion of the following stroke assists in clearing the cylinder of the useless products of combustion.

Therefore the best timing of the valves consists first, in opening the inlet valve late and closing it late; second, in opening the exhaust valve early and closing it late. The proper way to determine the best valve timing is unquestionably by means of the indicator diagram. But no suitable indicator for high speed engines is available. True, several indicators have been used, but their reliability is doubtful on account of the inertia of the moving parts. A great deal has been accomplished by experiment, using a cut-and-try method such as changing the valve settings step by step and testing for horsepower. While this method is not so scientific as a careful analysis with the indicator diagram would be, it is, nevertheless, quite satisfactory.

In selecting a valve timing that is suitable to a certain engine, an automobile engine for example, it is necessary to choose one that is suitable for all conditions or approximately so. In other words, a timing that would produce the greatest power at the normal speed of the engine, say 900 revolutions per minute, may seriously interfere with its working at 300 r. p. m. That this is true may easily be shown. Suppose the valves are set for best effect at 900 r. p. m. The inlet valve may close so late that at 300 r. p. m. the charge may be blown back through the carbureter, wasting gasoline, and so prevent securing a perfect mixture. Or the exhaust valve may open so early that some of the power is thrown away at the lower speeds. This is not only possible, but probable. It is a great inconvenience to have the engine fall short in power at low speeds, especially in climbing a hill on the high gear. For it is then that power at low speed is needed the most. In racing machines, wherein the greatest power is needed at the high speeds, a valve setting should be used that will give the greatest power at the racing speed without regard to the power at low speeds; but for the ordinary touring car it can be carried to extremes.

In general the best setting of the inlet valve for closure should be such that there is no blowback or reverse current through the carbureter at a speed of say 300 r. p. m. In determining the valve setting of a new design set the inlet to cut off late, and gradually feel your way until at 300 r. p. m. a slight blowback is felt. Then cut back the face of the cam a few degrees. The point is to make this closure as late as possible without interfering with the working of the engine at low speeds. The engine is so seldom, in practice, run below 300 r. p. m. that a slight blowback at lower speeds may be considered of no consequence.

The determination of the point of closure of the exhaust valve may be accomplished by similar methods. The column of exhaust gas being under way at the end of the exhaust stroke has sufficient momentum to produce a vacuum in the cylinder even when the piston has passed the dead centre. Builders of stationary engines have long since recognized this fact, since in engines with automatic inlet valves the vacuum would open the inlet valve if means were not provided to prevent it. Then, with an engine governing on the hit-or-miss principle, especially those which hold the exhaust valve open during the idle stroke, some means must be employed to prevent a charge being drawn in when not wanted. This is usually accomplished by blocking the inlet valves at the same time that the governor acts to hold the exhaust valve open.

The determination of the time of exhaust closure should therefore be approximated by the time at which a reversal of current takes place in the exhaust passages. This cannot be done to such a nicety as with the inlet valve as the exhaust passages are usually long and tortuous. However, by using a moderate length of exhaust pipe without a muffler, it can be found very closely.

The time of opening can be best determined by the indicator diagram. But quite a little can be accomplished by trial. If too early it will be shown by

loss of power at low speeds when compared with the power given with a later opening. The time of opening of the inlet valve may be just as the exhaust valve closes or a little later, or in some cases a little earlier.

The conditions determining the relation of exhaust closure to inlet opening are chiefly the relative positions of the valves. It will readily be seen that when the valves are far apart it might be feasible to open the inlet valve in advance of the closing of the exhaust valve, but when they are in the same valve box it would cause a portion of the fresh mixture to escape through the exhaust valve.

I have used with success the following valve timing on a 5½ by 6-inch engine, with the engine running at 300 to 1,000 r. p. m. Inlet opens 10° past the center, inlet closes 42° past the center, exhaust opens 42° ahead of the center and closes 5° past the center. The opening of the inlet and the closing of the exhaust, however, I have seen carried to 17° and 12° respectively and the opening of the exhaust to 53° 30′ in advance of the center. At 42° closure of the inlet valve there was no perceptible blowback through the carbureter. The engine, a four-cylinder, gave over 48 horsepower at 900 r. p. m. An extremely good performance for a four-cycle engine.

This engine was a good example of the advantage of proper proportions and proper timing. As originally designed and built the passages were small, the valve lifts insufficient and the timing a sort of "catch-as-catch-can." In consequence the engine gave only 21.5 B. H. P. at 900 r. p. m., or 45% of the power obtained by proper proportions and careful valve setting. Of course, this is an extreme case. The amusing part of it, however, is the fact that the builders of the engine rated it at 60 H. P., a power it was absolutely incapable of approaching in the condition it was in originally. Assuming that the power would increase in direct ratio to the speed the engine would have to run at 1,120 r. p. m. to give its rated 60 B. H. P.

The reader should note that these valve timings do not represent the time that the valve is fully open, because no cam can be made to open a valve instantly. As a matter of fact nearly 40° of cam movement is employed in opening and in closing the valve, so in case a valve remains open 100° of the cam shaft movement, 80° of the movement are employed in opening and closing, leaving 20° only during which the valve is fully open. However, the time when the valve is approximately open to its full lift is about half the time it is off its seat. That the valve is not at all fully open during this period has much to do with the fact that its timing may be prolonged without deleterious effects. Don't overlook the fact that the angular movement of the cam shaft is one half that of the crankshaft and, when a valve remains open 200° of the crank circle, the corresponding cam movement is but 100°. Further, remember that angular rotation of the crankshaft and not fractions of the piston stroke is what determines the valve setting. It is a time element and not a distance element that effects the flow through the passages.

The angular opening of the valves is not, however, in direct proportion to the speed, because of the varying speed of the piston at different portions of the stroke, and owing to the fact that the pressure of the gases at exhaust is greater as the time of opening approaches the beginning of the expansion stroke. So it does not follow that if 42° advance is the proper time to open the exhaust valve at 1,000 r. p. m. that 21° is the proper time to open the valve at 500 r p. m. As a matter of fact, at 500 r. p. m. the time of opening for best effect would probably be somewhere between 30° and 35°. It is only by careful consideration of all the points involved, together with careful testing in the manner suggested above, that the best valve setting can be determined.

While many of the points above enumerated are appreciated by designers of four-cycle engines, in two-cycle engines blunders are the rule rather than the exception. In the two-cycle the piston-opened port takes the place of the valve and the timing is obtained by the location of the port edges with reference to the ends of the stroke. Quite a number of designers proportion the ports according to the length of the stroke without reference to the crank angle. They do not seem to realize that the time element is the important one. As a matter of fact most novices in two-cycle design make their ports too narrow for the cylinder and too wide for the crankcase.

If the crankcase port is made too wide the mixture will be drawn back through the carbureter at low speeds and, as with the four-cycle engine, this is what, in the main, determines the time of the port opening.

With a four-cylinder engine there is still another factor to consider. When drawing from a single-carbureter, if two of the ports are open at the same instant the port just opening will rob mixture from the crankcase where the port is just closing. To avoid this two ports must not be open at the same time, and hence this limits the time of the port opening to 90° of the crank circle or 45° each side of the center. Fortunately, however, this angular opening will give excellent results if the area of the port is not constricted.

The port angles used by one prominent manufacturer of two-cycle automobiles are 45° for the cylinder inlet and 60° for the exhaust. A good rule for the length of the port is to make it one half the diameter of the cylinder.

Another feature to be watched closely is the volume of the crankcase. This is generally a point little understood by the novice. If anything he is inclined to overdo the matter and try excessive compression in the crankcase. If the connecting rod be kept twice the stroke, or as nearly so as practical, and the crankcase made with ¼-inch clearance about the connecting rod and crankshaft, no filling blocks on the crankwebs will be necessary nor will it be necessary to fill the piston.

A piston ring at the open end of the piston is not necessary and will never be missed if omitted. If two ⅛-inch oil grooves are turned near the bottom of the piston the ring of oil will answer every purpose.

Making Use of a Burglar

The automobile burglars who have been infesting Long Island for months past have induced many people to be ready should the raiders pay them a nocturnal visit. A night fireman and watchman named Thomas Curtis, of a factory on the outskirts of Brooklyn, received such a visit a few days ago and made humorous use of his opportunity.

Curtis was attending to his duties one night when he heard some one opening the scuttle on the top of the boiler house and presently a would-be burglar dropped into the firing room. The watchman had a revolver ready for the intruder, and the first order was "hands up," which was promptly executed, the sixshooter being very persuasive. Presently the fires had to be attended to and Curtis compelled the burglar to busy himself shoveling in a supply of coal.

As a fireman the burglar was a success—the ashpits needing cleaning, he was directed to do that work, the pistol being held in menacing evidence. A supply of coal had to be wheeled from one end of the powerhouse to the other, several tons of it, and the burglar was compelled to perform that operation. There was a good deal of polishing of brass in arrears, so the burglar was put to scouring and polishing, which kept him busy until the roosters of the neighborhood began to proclaim the coming day. Then the burglar was permitted to depart in peace.

The foundation of character is sincerity. Without it there simply cannot be built anything that will endure. And sincerity is disclosed in little things as well as in great.

AUTOMOBILE MAGAZINE

A PRACTICAL JOURNAL OF AUTOMOBILING AND ENGINEERING

THE AUTOMOBILE PRESS

ANGUS SINCLAIR, President and Editor
JAMES KENNEDY, Associate Editor

Advertising Department
JAMES R. PATERSON, Manager, N. Y.
R. M. STICKLE, Detroit, Mich.

British Representative
THE LOCOMOTIVE PUB. CO., Ltd.
Amen Corner, Paternoster Row, London, E. C.

Glasgow Representative
A. F. SINCLAIR, 15 Manor Road,
Bellahouston, Glasgow

Copyright, 1907, by the Automobile Press.

Entered at the New York Post Office as Second Class Matter.

Ninth Year. No. 3 Price, 10 Cents

NEW YORK, MARCH, 1907

Cable Address, Locoauto, New York. Tel. 984 Cortland

Publishing Office, 136 Liberty St., N. Y.

Maintain Roads in Good Order

Good means of transportation is one of the most important requirements of civilization, and the foundation of easy transportation has been good roads. The people of the American continent have been slow to appreciate the value of and the necessity for good roads, but they are beginning to appreciate this fact now, thanks to the improvement in sentiment propagated by the automobile fraternity. In almost every State of the Union agitation is operating for the construction of roads that will carry vehicles without smothering them in dust during summer or miring them in mud holes when softened by rain.

The sentiment calling for the construction of good roads is sound and proper, but the sentiment in favor of maintaining expensively made roads in proper condition is so badly lacking that it may be regarded as non-existent. The idea conveyed by the homely proverb, that "a stitch in time saves nine," is utterly lacking among the people that the various states appoint to supervise the roads. There are high-sounding titles of road supervisor, road superintendent and roadmaster applied to people whose most arduous duty is drawing the salary connected with the mysterious office they hold.

In well governed countries, where macadam roads have been long in use, the maintenance of such roads has become more of an art than the making of them. When a road is once macadamized it is kept up in such good order that it never has to be remade unless under very exceptional circumstances, such as a sinking or sliding foundation. When a line of roadway has been macadamized and put into service then constant care bestowed upon it to promptly repair any defect from traffic, inferior material or damage by flood or frost. When heavy vehicles cause ruts they are promptly filled up and obstructions laid to prevent wheels from doing fresh damage before the material settles. Eternal vigilance will keep that road from acquiring ruts or ridges, and when it is worn down to near the heavy stone foundation a new top dressing will be put upon it, making it good as new. Under such management good roads are maintained at very low cost.

The modus operandi of road maintenance is very different in most states of America. The macadam road is generally well made by first-class material having generally a good draining foundation. With proper care that road would wear indefinitely, but under popular usage it is ready for remaking within a very few years. The writer had an excellent opportunity to witness the rise and fall of a macadam road in New Jersey, and the story is typical of what is going on regularly all over the United States. When we made its acquaintance it was a miserable dirt road, freely impregnated with rough boulders that brought many a bicyclist to grievous falls. About three years ago the road was macadamized and the work was well done. The following spring the frost came out of the ground through a warm wind and warm rainfall that made the surface of that road very soft. The people in that neighborhood required much coal in the spring and many heavily-loaded coal wagons passed over the road, cutting deep ruts that ruined the surface. No attempt was made to fill them up. Shortly afterwards many people began building houses beside the road and excavations were made to reach the water pipes

ZAMBESI RIVER RAINBOW FALLS.

and other excavations were made to reach the gas pipes. The ditches were filled up without any attempt to restore the road surface to its original condition. Some of the fillings were different in material and left, thank you, ma'ams, while others had too much and left ridges. Whether it was on ridges or on furrows the wheels of heavy drays found a weak spot that led to tearing the surface of the road. No repair was put upon it, and to-day that road is now one of the worst streets in the suburbs of Newark.

When the people who cut a ditch in a road to reach supply pipes are remonstrated for not filling it up to make the surface as near as possible to its original condition they answer that such a thing is impracticable. It is impractical because there is no attempt to make it practical.

There are a few reforms necessary to keep good roads from falling to ruin prematurely. The employment of labor to make the stitch in time, instead of high-priced supervisors, prohibiting the use of narrow tires on heavy vehicles, and the compelling of property owners to leave the road as they found it when excavations were made on it for any purpose.

Winter Tours

The reports of winter touring in motor cars that have come to us indicate that the best work has been accomplished by cars of medium weight and invariably of short wheel base. It can readily be imagined that in view of the deplorable condition of the roads in the winter time, the heavy high powered touring car, with its long wheel base, is not calculated to make good time in the tortuous windings of snow-wreathed country roads. It may be remarked that when high speeds are impossible the tendency to overheat the cylinders is greater when the engines are run for lengthened periods on low speeds. To obviate this, the system of cooling should be of the best, and while the question of air or water cooled engines is still a controversial question, it will be generally admitted that in a snow-clad highway there is little need of apprehending a shortage of water. Indeed, it has been claimed that melted snow is free from the impurities common to much of the roadside water, especially in the Western States, where the alkaline substances peculiar to water in these localities are an added source of trouble to the automobilist.

Another important item in the construction of cars suited for winter tours is the upholstery. There is a growing tendency towards overdoing this item in car construction in point of luxurious show, but it can never be overdone in point of substantial material. Plain work of the best material is much superior to elaborate work with a poorer class of goods. Care should also be taken in selecting cars for long continued tours to have suitable baggage accommodation. This point is being given much more consideration than in last year's models, and we have seen several cars were a roomy compartment has been arranged in the body of the car for baggage, and its use has greatly enhanced the pleasure and convenience of the party enjoying the tour.

Public Safety

A committee on public safety for autoists, under the chairmanship of Mr. W. S. Scarritt, of the Automobile Club of America, have been actively considering the problems arising out of the use of motor cars on public highways, and have suggested methods of safe operation in these cars. The committee, as the result of their preliminary work, have issued a report containing many valuable suggestions from which it may be particularly noted that the best interests of automobilism require that autoists should drive with the greatest restraint and always within the limits of safety to all users of the highway. The carefulness of the auto driver must provide against the carelessness of the general public. This is the automobilist's burden. It has been placed upon him in accepting the charge of the new and powerful engine of locomotion. The proper and thoughtful use of the horn is also pointed out. It is enough that the person purposed to be passed on the highway should know of the approach of the motor car without filling the air with unnecessary clamor. To remove danger as well as to remove prejudice from the minds of the general public seems to be the aim of the committee's excellent report, and it cannot fail to have a salutary effect on all who have the best interests of the sport at heart.

Artificial Rubber

The man who invents or discovers an artificial substitute for rubber will have no occasion to worry about ways and means afterward. Raw rubber is at Pará to-day well over 60 cents a pound, with little immediate prospect of any fall in price. The report published in a Swedish paper a few weeks ago that a material had been prepared by a Stockholm chemist which surpassed rubber in all that article's essential qualities was, however, naturally received with a good deal of scepticism. Like the Highland parson describing to his congregation the doubts of Moses regarding Pharaoh's good faith when the latter cried from the Red Sea for help, promising all things the while. "Pharaoh," said Moses (according to the parson), "Pharaoh, I haf seen you pefore!" And artificial rubber looks like an old friend, I seem to have heard of it before, it has been so often promised, and has just as often failed to turn up. Still, with artificial silk from wood, nitric acid from the atmosphere, and such like, there appears to be nothing impossible about artificial rubber. The article referred to is said to have been used for tires with pronounced success, and being tougher and lighter than rubber it is less liable to puncture, while being more resilient. On test in the Stockholm Technical College it is said to have been found seven times as strong as rubber, and could be stabbed without losing air. After three months' use as packing in vacuum brakes on the Swedish state railways the material is said to have given better results than natural rubber. Should this article materialize the American company, who planted rubber forests on the Amazon some fifteen years ago, and are now on the point of paying dividends, should experience the discomforts of a rather severe slump.

War Training Into Arts of Peace

It is sad to reflect that the arts of peace have received the most progressive impulses from the arts of war. A bronze knife or hatchet was considered sufficient for culinary and other domestic purposes, and ambition would not have labored for improvement had it not been discovered that steel made a more deadly weapon than the alloy of copper and tin.

Had it not been for the development of the art of molding in the making of cannon, the skill to cast a steam cylinder might never have been reached, certainly not for centuries later than the work was done. The ancients were evidently satisfied with the means of inland transportation obtained on the backs of animals, and wheel carriages would never have been introduced had some aggressive war chief not found out that his warriors could do more effective destruction by rushing against their enemies on a wheel carried platform. The war chariot was the precursor at a long distance of the coach, while the coach prepared the way for the modern car. The American word car, which has a military origin, is crowding out the English words coach and carriage from all English speaking peoples, yet when a wheeled vehicle was first used in peace for carrying persons it was called a car.

At one of the recent automobile shows we heard an agent for a certain car declare with emphatic pride that there was not a single part of the 1907 car the same size and form as those on previous cars. The previous cars must have been miserably defective when such changes were necessary.

Need Not Look or Listen for Automobiles

"Stop, look and listen" is the legal duty of people crossing railroad tracks, and failure to do so entails contributory negligence if they get hit by a train. That law does not apply to pedestrians using the highways. The common law of England, from which our common law comes, gives the pedestrian right of way and the vehicle driver must see that he does not hurt the person walking. The old Roman law, which applies to most Continental countries, requires the pedestrian to look out for himself. When a person is struck by a vehicle in the streets of Paris the police always arrest the unfortunate who failed to keep out of the way of the lordly vehicle. The Code Napoleon, which favors the masses, did not change that ancient iniquity.

The Supreme Court of Massachusetts holds that a traveler on a highway is not, as a matter of law, bound to be continuously looking or listening to ascertain whether motor cars are approaching, under the penalty that his failure to do so will constitute contributory negligence, precluding a recovery for insurance sustained in a collision. The Court says: "There is no imperative rule of law which has been called to our attention generally requiring a pedestrian, when lawfully using the public ways, to be continuously looking or listening to ascertain if motor cars are approaching, under the penalty that upon failing to do so if he is injured his negligence must be conclusively presumed. The traveler not only has the right to presume that the way is reasonably fitted for his use, but also that those who may be lawfully using it with himself will exercise a proper degree of care."

"Lady" Hack Drivers in Paris

Many perfectly respectable young women in France are singularly untrammeled by rules of conduct popularly regarded *comme il faut*. This is displayed in a recent movement in Paris where young women are offering their services as cab-drivers. Some of them have begun work in that line and merely cause a mild sensation.

The hackman in France is called a *cochèr*, and a hackwoman, accordingly, *cochère*. The English speaking visitor with a smattering of French often gets confused between *cochèr* and *cochon*, the latter word meaning swine. The mistake is sometimes resented when the word is frequently repeated.

At the end of a ride the *cochère* always looks for a *pour boir*, a tip, which literally means for drink. We expect the *cochère* will turn up her eyes with an appeal *pour candi*.

The *cochères* are reputed to be working to monopolize the driving of motor cars in Paris. The electric cars would suit them very well, but gasolene car attentions might be awkward, such as creeping below to examine a defective valve.

To Vanquish Weariness

Automobile interests and every new pastime is particularly beneficial to old men. An elderly man has fewer resources at his command than a woman at the same period of life. The multiplied uses to which a woman puts her hands—her knitting, her darning, her embroidery—all help her to pleasant occupation when she no longer needs to engage in the more serious vocations.

As a rule, a man in active business uses his power to one end only, and gravitates between his office and his home, the latter being for him a place of absolute leisure. A fad of some sort is a great relief to ennui, and as men advance in years they would be wise, forecasting the time of solitude, to cultivate a love for reading, if they do not possess it, or to take up some pursuit outside the daily grind. The outdoor life of the automobile faddist is peculiarly wholesome for men who have passed the age of active work.

Travel Limitations

Man is provided by nature with very limited powers of locomotion. Without artificial aid in carrying the means of sustaining life he would see little of the world beyond the spot where he was born. Every step made by tribes in rising away from barbarism is marked. Improvements in the means of transportation and the means of intercommunication of a nation have generally been a fair indication of its condition in the scale of civilization. The most prosperous and powerful nations whose history is recorded are those that developed the best means of transportation.

Some tender foot clod hoppers who got into the present Indiana legislature attempted to gain cheap notoriety by introducing malevolent bills to oppress automobilists. One called for reduction of speed to three miles an hour while passing vehicles and changing the size of registration numbers from 4 to 8 inches. One wanted the killing of a person by an automobile to be adjudged as manslaughter, no matter who was at fault. The Indiana Automobile Manufacturers' Association were on the alert and had all the measures expire unhonored.

PACIFIC COAST SCENERY—STEAMER ON ARROW LAKE.

The high rates charged by the railroad companies for transportation of automobiles to Florida has a most pernicious influence upon the popularity of the Florida annual automobile races. As a means of maintaining the interest in these races it would be well for the American Automobile Association to arrange in good time with the steamship companies to carry automobiles to Jacksonville on fair rates.

Information Bureau

We are always pleased to publish answers sent to this department and we invite the sending of questions likely to prove of general interest. We answer by mail questions relating to the merits of various cars or automobile appliances.

Electric Current Does Not Kill Birds

L. S. B., Newark, O., says: A friend of mine tells me that birds sometimes perch upon high current electric wires without being killed. Is this possible? A.—It is quite possible. In such a case the current does not go through the bird, but merely warms its feet. If the bird was connected with the ground by any conductor the current would kill it.

Cleaning Crank Case

S. M., Racine, Wis.—The engine crank-case should be drained clear of used oil before running 500 miles. It must be remembered that in lubricating the cylinder the oil is subjected to great heat, and is also used over and over again. It soon becomes charged with impurities and loses its viscosity, causing abrasion, and it is this that causes much of the cylinder trouble. It is good practice after cleaning the crank-case to remove the spark plugs and inject some oil into the cylinders.

Knock In Flywheel

N. S., Eastport, Pa.—There is only one cause that could make a continuous knock in the flywheel. The key holding the wheel to the shaft may become worn so that the wheel may have a slight motion on the shaft. If allowed to continue it will eventually shear the key. Lost motion longitudinally on the shaft would not create a constant and regular knocking, but new bearings should be fitted in, or the brasses may be increased in length by soldering strips on their outside edges.

Invention of Gas Engine

Machinist, Detroit, Mich., writes: I work in an automobile factory, and at meal hours we have some arguments about gas engines and how they originated. I say that Otto was the first man to make a gas engine, but have been contradicted by men who name other inventors. Who was the first man to make a gas engine? A.—A philosopher named Huyghens proposed using an engine driven by gunpowder as early as 1680. A whole host of experiments were made with gas engines after that, but nothing practicable was done till 1860, when Lenoir, a French engineer, placed on the market a one horsepower double acting gas engine, which worked fairly well. A year or two later Otto began experimenting with the gas engine, and made it a commercial success. Otto used a free piston or atmospheric engine at first, but he afterwards adopted the four-cycle plan, which goes by his name, but was proposed by Beau de Rochas.

Dirigible Air Ship

L. P. B. asks if a really dirigible balloon, or air ship, has yet been invented? A. The airship La Patrie, built for the Ministry of War, of France, seems to be a success. On its first trial it traveled for two hours and twenty minutes at a height of 600 feet. It averaged from 15 to 20 miles an hour. It answered its helm perfectly and turned easily. The ballooning staff of the Ministry of War say that it is the most perfect airship yet invented.

Gasolene and Naphtha

B. A. F., Springfield, Mass., asks: What is the difference between gasolene and naphtha. A.—Gasolene is naphtha, but there are a variety of naphtha liquids made from the distillation of organic substances that are different from gasolene. The distillation of products from coal tar, wood, peat, bones and a variety of other substances produces naphtha. Besides, gasolene, benzine and benzoline are naphtha produced by the distillation of petroleum. In some parts of the world naphtha is made from shale oil.

Work of Eli Whitney

Subscriber, Brooklyn, N. Y., writes: I notice that you have mentioned Eli Whitney as having introduced the system of interchangeable parts, but the daily papers say that the system was used in Russian arsenals long before Whitney's time. Will you do the other fellows justice by making this fact public? A.—We will. We have heard rumors of what you mention, but if the assertions were true it would not detract from Whitney's fame or from his usefulness to mankind. Whitney invented the cotton gin, which was fame enough for one person. Having got a contract in 1798 from the government for the manufacture of firearms, he put into practice a system of making every part interchangeable. It was soon applied to other lines of manufacture, such as clock making, and later the manufacture of sewing machines, from which it extended into lines as diverse as a locomotive and a watch. The world would have waited a long time for the Russian inventor to take the lead in these processes, which have done so much to promote American industries.

To Distinguish Between Gasolene and Water

A. Y.—I have had much annoyance from my gasolene being mixed with water. How can one distinguish between water and gasolene? A.—If the water is mixed with the gasolene the best plan to find it out is to put about a spoonful on a saucer and set fire to it in a safe place. All the gasolene will burn up and leave the water behind. Another way is to run the mixture through a bag made of chamois leather, when the gasolene will pass through, but the water will remain behind. If water in the gasolene has settled to the bottom of the tank it will pass into the carbureter and prevent the engine from starting. If the carbureter is permitted to overflow one can tell by the touch if water is running through. To become familiar with this touch dip the fingers into gasolene and rub them together, then do the same thing with water. A different sensation is felt between the two fluids. When there is a suspicion of gasolene being mixed with water, run a small quantity into a shallow dish, put it where there is no danger of fire and apply a lighted match. The gasolene will burn up and leave the water behind.

McAdam Roads

P. B. asks if the McAdam road was produced by evolution or by invention? A. It was an invention worked out by John L. McAdam, an American, who went to Scotland in 1783 and devoted his life to the improvement of roads. Before his time the best roads were made by digging three or four feet for a good bottom and then filling up with rough stones and gravel to a raised top. He began on the surface and covered it with broken stone to a depth of about twelve inches. Roads built in this way soon gained popularity and within fifty years were adopted by the leading countries in Europe. Most of the splendid roads for which France are famous use what they call *macadamisé*.

He or she who is easily satisfied with his or her work will never achieve greatness.

Popular Engineering.

Alcohol Needs Hot Cylinders

People experimenting with alcohol for automobile fuel would do well to remember that alcohol can stand a higher cylinder temperature than gasolene. The efficiency of alcohol varies very much with the temperature of the cylinder. With a cold cylinder the efficiency is very low and it rises quickly as the temperature increases. The cold weather that prevailed during the Maxwell-Briscoe tests had a very pernicious effect upon the alcohol.

Turbine Engines for Steamers

Turbine engines for marine purpose have not been shown much favor by our shipping interests, considering the popularity of such engines with the marine fraternity of Europe. We have had several pleasure yachts equipped with turbine engines, and the reports of their performance have been entirely satisfactory, but it was only since the year opened that a commercial vessel has been placed in service with turbine engines.

This was the "Governor Cobb," of the Eastern Steamship Company, of Boston, launched from the yards of the Delaware River Shipbuilding Company, Chester, Pa. The turbines and boilers were made by W. & A. Fletcher Co., Hoboken, N. J.

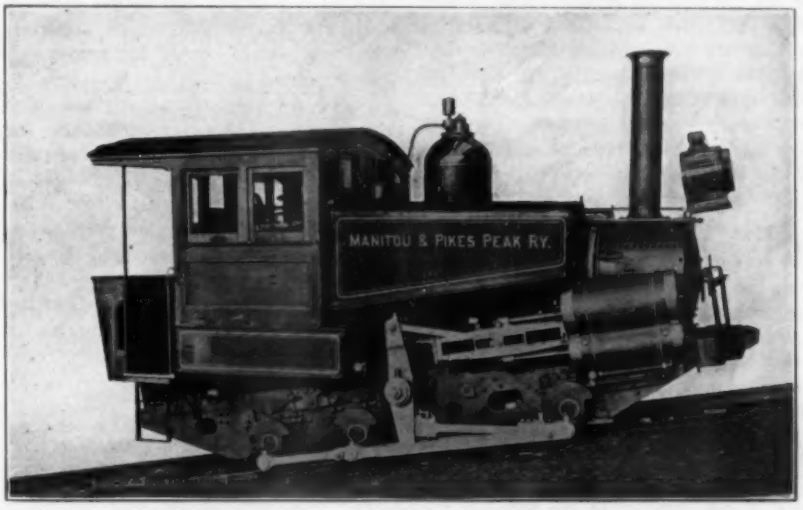
The ship, says Marine Engineering, has a length on the waterline of 290 feet, a length over all of 300 feet, a beam, molded, at waterline of 51 feet, a beam over the guards of 55 feet, a depth of 20 feet 6 inches and a load draft of 14 feet. The tonnage is 2,184. She has a steel hull with a complete double bottom and numerous watertight bulkheads. These latter include steel casings running up through the dome deck, so as to minimize as much as possible all danger from fire from this source.

The turbines are of the Parsons type, as developed by the present builders. They were designed for a total of 5,000 horsepower on three shafts, each of which carries one propeller. The centre turbine receives high-pressure steam, while the outer shafts have each in a single casing a low-pressure turbine and an astern turbine. The steam pressure of about 150 pounds per square inch will be supplied from six Scotch boilers fitted for forced draft.

The general method of holding the blades in place on their rotors consists in placing each blade within a properly formed groove and binding it there by means of a tight fitting wedge. The outer ends of the blades on the low-pressure turbines (long blades) are then fastened together by means of wire tape placed in proper grooves, and for further security brazed to the blade. This gives the same general effect, so far as strength is concerned, as the shrouds now used to some extent in other forms of the development of this turbine.

Locomotive for Pike's Peak

The Baldwin Locomotive Works recently built for the Manitou and Pike's Peak Railway a rack locomotive possessing several interesting features. The maximum grade on the road is 25 per cent. and the "Abt System" of track rail is used. In many respects the new locomotive is similar to those previously built, the principal differences being the use of three driving pinions instead of two, and the employment of oil as fuel instead of hard coal.



BALDWIN RACK RAIL COMPOUND ON THE M. & P. P. RY.

The boiler is set so that its axis is horizontal on a 16 per cent. grade, the cylinders being placed on an inclination of 4 in 25. The Vauclain system of compounding is used, and the wheels are driven though rocking levers having fulcrums bolted to the engine frames. The valve motion is of the "Good" type, with the eccentrics on the leading axle. The motion is indirect, the rocker shafts being placed behind the links and between the engine frames. A screw reverse mechanism is used.

The main frames are of steel plates ¾-in. thick, with cast steel pedestals bolted to them. They are braced in front by top rails, which are bolted to the cylinder castings. The second and third pairs of driving-wheels are equalized together, leaf springs being placed over the driving-boxes. The weight is transferred to the front pair of wheels through rubber springs, which are placed on top of the boxes.

The water supply is carried in side tanks, which are supported in brackets bolted to the boiler shell. The oil tanks are placed right and left under the cab floor. The oil is fed through a heater, located at the left side of the engine under the ash pan. The heater consists of an oil pipe 1¼ ins. in diameter, which is placed inside a 3-in. pipe about 4 ft. in length. The burner, which is of a type by the Southern Pacific Co., is placed under the mud ring in the front end of the fire box. Air is admitted through a hinged damper in the back of the ash pan.

The engine is equipped with steam, hand and water brakes. The steam and hand brakes are of the band type, operating on the first and second driving axles respectively. An auxiliary steam cylinder is also provided for operating the hand brake, if desired. The Le Chatelier water brake is operated by a valve placed on a level with the lowest gauge cock. The exhaust nozzle is fitted with a shut-off valve operated from the cab, to prevent drawing in air from the smoke box when the engine is reversed.

Harnessing Victoria Falls

The falls of the Zambesi River are about to be electrically harnessed in the interests of the development of South Africa. The British South Africa Company have shown to interested stockholders in London a system of models, maps, pictures and diagrams illustrating the manner in which the great forces of the stupendous cataract can be util-

ized upon a scale that will doubtless have an important effect upon the future destinies of South Africa. In that dark continent, work requiring unskilled labor cannot, generally speaking, be done by white men. It is of great importance to increase the economic opportunities for white skilled labor. That the vicinity of the Victoria Falls will become a great industrial center there can be no doubt. The distribution of power to the Transvaal mines is under immediate contemplation, and what has been done at Niagara Falls will in a few years be far surpassed by the utilization of the stupendous force of the Zambesi Falls. With nearly three times the width of Niagara, and more than twice the height of that great cataract, it does not require any great flight of the imagination to realize that with the modern methods of electric transmission the whole table land of Central Africa will feel the effects of the distribution of this titanic power. New industries will spring up, and it will be by forces such as these that the march of civilization will be hastened rather than by the conquests of rival powers, whose methods of spoliation and robbery have been a blot in the face of the dark continent.

Heat Electrically Produced

A very interesting experiment which reveals the action of an electric current and the generation of heat was many years ago performed by Tyndall in one of his public lectures. It should be remembered the grand discovery made by Faraday was that when a conductor of electricity is set in motion between the poles of a magnet a current of electricity flows in the conductor. This is the fundamental principle of the dynamo as we know it today.

Tyndall's experiment consisted in having a U-shaped electro-magnet set up on a stand with a pair of loose pole pieces, one on each end of the U-magnet. Between the poles he placed an ordinary silver medal, such as a soldier might wear, and suspended it by a twisted string. In order to make the revolving motion of the medal apparent as the string unwound, a four-sided mirror was placed on the string and a beam of light played on the mirror; the beam, striking the revolving mirror caused a series of illuminated patches of light to follow one another on wall and ceiling while the mirror turned, as the string unwound.

The moment a current of electricity was switched on, the space between the pole pieces became, as Tyndall describes it, just as if it were filled with a viscous liquid. The revolving medal struggled to keep on turning and then stood still with the string but half unwound as if it had been immersed in a pot of treacle instead of hanging freely in the air. As soon as the electric current was interrupted, the influence of the magnets disappeared, and the medal resumed its spinning motion.

A further modification of this experiment was made by placing between the pole pieces an upright hollow cylinder of copper, filled with a hard but easily melted alloy, something like the fusible plug in the crown sheet of a locomotive. This copper cylinder was made to spin round by the use of an ordinary whirling table, turned by hand. The copper cylinder placed between the poles of the magnet contained solid metal. It was rapidly spun round, without wobbling and hardly disturbed the air around it. As soon as the electric current was permitted to flow through the magnet the copper cylinder offered considerable resistance to being turned, and when forcibly made to rotate by vigorous action imparted to the whirling table, the cylinder gradually became hot and at last the fusible core melted and splashed out of the top of the cylinder, and when the whirling ceased the white metal was poured out of the copper cylinder in liquid form.

These experiments were made with medal and cylinder surrounded by the free air of the room and neither of them was in contact with the electro-magnet or any part of the apparatus. They occupied the space between the pole pieces, and by their arrested motion and the generation of heat made visible the effect which may be produced by the silent but potent influence of the electric current.

Ignition Device

A device for verifying or controlling the ignition of the cylinder of multiple-cylinder explosive engines has been devised and patented by M. A. Clement, of Levallois-Perret, France. It consists of a plurality of independently-operable testers, one for each cylinder and each provided with a connecting member, normally connecting two terminals in the primary circuit of one of the igniters, said members permitting of determining, by moving all but one of them, which, if any, cylinder of the engine is defective, and means whereby the further movement of said members completes the primary circuits and produces ignition.

Germans Encourage Air Navigation

The Germans appear to be taking the attempts to introduce aerial vehicles seriously, and the Emperor, with his usual energy, says a dispatch to the New York Sun, has determined that Germany shall be in the van in the development of aeroplanes. The government is doing everything possible to encourage inventors to devote themselves to the problem, and a special committee has been appointed for this purpose.

Local societies have sprung into existence at Munich, Strasburg, Augsburg, Posen and several other centres, as well as in Berlin, all of which are intended to promote aerial navigation.

The most important step has been taken at Dresden, where an association has been formed which is intended to be of national scope. The members are pledged to do all in their power to interest scientific men throughout Germany in aeroplanes and lend the utmost support to the development of such machines.

Beginning of Artificial Means of Transportation

Nature has supplied mankind with means of locomotion that can take him unaided over the earth at about four miles an hour. Compared with modern artificial means of locomotion that rate of speed is slow. There was a time when man's pace was the most rapid available means of transit, but using one's legs as a means of progression seems never to have been popular, for inventive ability from the earliest times has been directed to scheming plans for saving people from the exertion of walking. We have no direct evidence that man during the primitive garden period of existence called in the aid of less cunning creatures to carry himself and his rude mattocks and spades, but as far back as human records go, we find the lords of the earth harnessing the more docile animals to bear his burdens. He who first mounted the back of the fiery cow, the first animal to be mounted, was, no doubt, regarded as a hero worthy to lead his clan. From steeds of the cow-kind the line of progress went by the way of donkeys of less high degree to the horse, camel and elephant, which may be regarded as the limit of animal locomotion.

The Municipal Explosions Commission of New York City have determined that as soon as a suitable device has been agreed upon all garages in that city will be required to install traps in their drain pipes which will prevent waste gasolene from entering the city sewers. Unfortunately an efficient device for that purpose is not in sight. When it comes all cities will be compelled to use it.

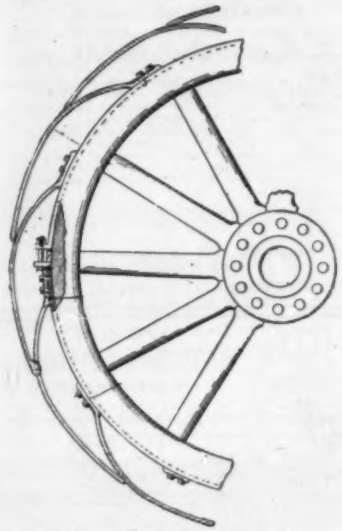
Patent Office Department

In the rapidly increasing number of devices patented by our inventors in connection with the automobile it is observable that the vast majority of the contrivances are aimed at the improvement of the machine as a vehicle for pleasure tours. Wheel tires seem to be a constant theme for experiment, and in addition to shock-absorbers are reaching a degree of perfection that

leaves little hope of further improvement. The selections that we make from last month's reports are all worthy of the earnest consideration of automobile makers and users.

Vehicle Wheel

Mr. S. Childs, Bernardsville, N. J., has patented an improved wheel for vehicles, No. 836,302. It consists of a detachable band on the rim of a wheel, with a series



of leaf-springs on the band, having their free ends bent concentric to the wheel and having the free end of each spring in contact with the next succeeding spring, thereby forming a resilient tire.

Thermostatic Valve

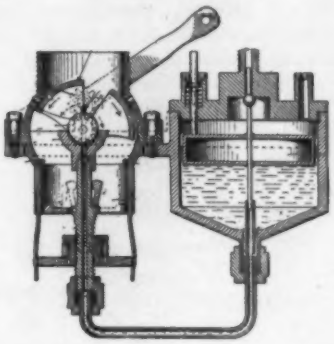
Mr. J. H. Davis, Chicago, Ill., has patented a thermostatic valve, No. 836,636, comprising a closed casing, provided with an inlet and an outlet and composed of material having a low coefficient of expansion. It is furnished with a valve suspended therein having a stem composed of a material having a high coefficient of expansion, and resilient means between the valve and the stem which allows for extra play of the valve after the valve has reached its seat. The parts mounted in the casing are removable through the cap of the casing.

Engine Starter

Mr. G. F. Brandhuber, Pierre, S. D., has secured a patent on an engine starter, No. 836,559. The device is a combination of a screw having a gradually decreasing pitch, a non-rotary nut engaging the screw, a clutch member secured to the end of the screw, a pivoted lever connected to the nut, an engine having a crank-shaft and means for connecting the clutch to the crank shaft, whereby the speed of rotation of crank-shaft is gradually increased as the lever is moved along the screw at a constant rate of speed.

Carbureter

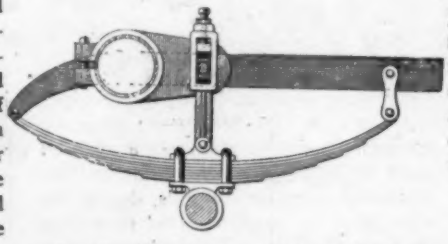
A carbureter has been patented by Mr. C. D. Shain, Rockaway Park, N. Y., No. 835,564. It comprises a shutter-throttle made of two portions of a hollow sphere, each of these portions turning in opposite directions on a common axis by means of gears, with cranks and levers so arranged that each portion may at times be moved separately. There are air-ports near the top of the mixing chamber arranged so that they may be closed, or part-



ly uncovered, and also air-shutters at the bottom of the air-chamber of the carbureter, the raising and lowering of which may be controlled by the intervention of a part of the shutter-throttle between the gas-outlet and intake shutters at the bottom of the air-chamber and a ball seated in a support and a tube for gasoline or liquid fuel discharging under the ball. The adjustment of the ball is regulated by a thumb-nut.

Shock Absorber

A shock-absorber interposed between the axle and body frame comprising



a fractional device by which the springs are stiffened and their movements retarded on rough roads, has been patented by Mr. R. P. Winsor, Providence, R. I., No. 818,646. The mechanism comprises a circular drum attached between the frame and lever piece, including a strap with a lining of leather embracing the periphery of the drum and provided with a slotted connection embracing a stud, and a means in the slot for cushioning the contact of it with the stud.

The "down" of the eider duck is so elastic that 5 pounds of the best quality is sufficient for a bed.

Wheel Tire

Mr. A. S. Allen, Brookline, Mass., has secured a patent for an improved wheel tire, No. 835,005. The device consists of a flexible tire composed of intermeshed wire coil having a cover-

ing of india rubber in which the wire armor is embedded. The combination has the elements of strength and resiliency.

There are nearly two million workers in New York, of whom more than 200,000 are engaged in certain occupations wholly or in part calling for night work. They include steam and street railroad men, marketmen, postal clerks, nurses, bakers, reporters, waiters, actors, teamsters, policemen, firemen and telegraph and telephone operators. A fair estimate places 100,000 men as engaged in work during the hours of darkness. Of late the night-hawk automobilists have been adding rapidly to the number of night workers.

A New York magistrate has had the audacity to sentence an automobilist to jail for five days without the option of a fine because he was convicted a second time of reckless speeding on the streets of the city. If those cranky magistrates are not warned to be tender with the offending hot bloods, our sporting sparks will banish themselves to New Jersey.

There is a Book Department connected with THE AUTOMOBILE MAGAZINE which carries a fine selection of books on automobile subjects. If a reader wishes to buy any kind of book that is for sale our Book Department will supply it at as low a price as any. It also takes subscriptions to magazines, newspapers and all other sorts of publications.

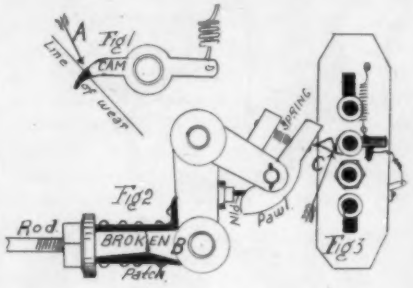
THE AUTOMOBILE MAGAZINE conducts an information bureau which gives advice free respecting everything relating to motor cars or their accessories. Better consult our bureau if you think of purchasing a car or any part thereof.

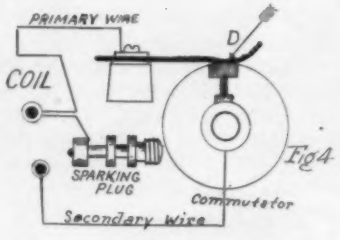
Electrical Ignition Repairs

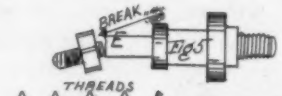
Figure 1 shows the form of electrical ignition trigger which often gets out of kilter, due to wear and tear. In one case the ignition mechanism failed to work, due to the fact that the end of the small trigger was worn down to a considerable degree at the portion designated by the black part. The cam arrangement was such that it was necessary that the trigger be complete in every detail. So long as the surfaces of the trigger were even, no trouble arose. But as the metal commenced to wear off, and part of the surface become depressed, the trigger failed to effect its mission and the mechanism of the device ceased to work. In order to restore the trigger to correct proportions, the same was removed and the end ground off. Then a new tip was dovetailed in. A far better method consists in putting in a complete new trigger. Unfortunately the repairmen do not carry a complete line of parts for this service and oftentimes pieced up work is necessary as in this instance. The repaired trigger operated well for a little while. Then the affixed portion began to work lose. Trouble started in at once. Once more the device was patched up. Finally the machine was put up at a reliable repair shop, where tinkering and patching were not indulged in unless no other way presented itself to keep the machine going. Then a new part was installed and additional trouble ceased until one day the arm broke off, as shown in figure 2. In this type of mechanism, it is essential that the pawl carried by the upper arm of the bell-crank lever force down the small trigger quite promptly. This is necessary because of the quick movement needed in the action of the movable electrode. Anything that tends to interfere with the motion of the trigger or the pawl is likely to handicap the operating rod. In the adjustment of the mechanism, the worn and defective trigger caused the parts to catch at intervals, resulting in the breaking of the arm as at *b*. Then the machinist went to work and applied the patches of metal as shown. The pieces were put on either side and rivets inserted and headed up. This made a tight union for the time being. But in time this union worked lose and one day the end of the trigger was snapped off as at *c*. Then the mechanism remained idle. In the adjustment of the mechanism of the ignition mechanism, it is advisable to avoid patched up parts, as all automobile machinists are well aware. Regardless of troubles constantly arising from this source, your correspondent is constantly observing instances in which machines are stalled simply because of imperfect repair work.

In figure 4 is the plan of the jump-spark wiring mechanism. You can cut out the magneto-generator by moving the switch finger. I find that there are troubles arising from the defective method often employed in effecting contact at *d* with the contact maker. You want to get your wires right and then go to work on the setting of the sparking plug and the installation of the commutator. With these parts correctly adjusted, there will be no bother with the contact maker unless there is something wrong in its own detail of adjustment.

In one job, the screw of the spring was broken by improper use of a point of a cold chisel placed beneath the head of the screw. One side of the screwhead was broken off. Hence it was impossible to turn the screw. Finally a pair of wire-cutters were used to clip the remaining side of the screwhead and then the screw was turned out and a new one put in. On another occasion, a stud was broken off as at *e*, figure 5, and this permitted the current to break at intervals, due to the slipping of the pawl. Instead of putting on a new stud, the end of the broken shaft was headed up with the pawl left on. Consequently the pawl had a chance to work to and fro and the trigger was missed at times and uneven ignition resulted. You want to get the nuts threaded on correctly. You would be surprised to observe how many cases of defective ignition arise from improper care of the nuts and threads of the adjusting parts. There is the V-shaped thread, as in figure 6, and the standard English thread, as in figure 7. Both these forms of threads may be found in use on the mechanism of the ignition system of the modern motor car. I find that many of the threads of both sorts are stripped and worn, due to poor work-







THE AMERICAN MERCEDES

Gentlemen's Runabout won the following races at the ORMOND MEET, 1907, with 70 H. P. Stock Engine. Reports that this is a special racing engine are false; all proofs are at our factory, Long Island City, New York.

Gentlemen's Runabout, 70 H. P., any style body	$10,000
Regular Touring Car, 70 H. P.	10,000
Gentlemen's Runabout, 45 H. P., any style body	7,500
Regular Touring Car, 45 H. P.	7,500
Chassis, 45 H. P.	6,750
Chassis, 70 H. P.	9,000

We only build two engines at the present time, 45 and 70.

Races We Won at Ormond:

January 2nd, 1907—Five Mile Standing Start, all classes of cars. Time 4 25 min.

January 23d, 1907—Ten Mile Standing Start, all classes, 7.42 min.

January 24th, 1907—Ten Mile Handicap, all classes, 8.44 min.

January 24th, 1907—One Hundred Miles Standing Start, all classes, for the Minneapolis International World Championship Trophy, former holder, S. F. Edge, London, England. Time 1 hr., 29 min., 10 sec.

This car also won the 10 mile touring car race at Poin Breeze, November 24th, 1906

The performance of our car at Ormond demonstrates its qualifications.

All parts of our car fit the German Mercedes, and theirs fit our car because the two machines are absolutely identical.

FACTORY, 937 Steinway Avenue
Long Island City
SHOWROOMS, 1777 Broadway, New York

POCKET
BATTERY AMMETER
0 to 30 Amperes
In testing single cells, the cord is not necessary. Accurate.
Price $3.50
Eldredge Electric Mfg. Co.
Dept. M. SPRINGFIELD, MASS.

USE YOUNG'S
Non-Freezing Solution
for your Radiators and
YOUNGELENE OIL
for your cylinders, and zero weather will not mar your pleasure. Let us give you prices.
O. W. YOUNG
NEWARK, N. J.

MOTORS THAT MOTE
To keep the motor motoring use
DIXON'S MOTOR GRAPHITE
It means best speed, highest efficiency, least wear and noise. Write for free "proof" sample.
JOSEPH DIXON CRUCIBLE CO.
JERSEY CITY, N. J.

JUST OUT
The Atlas No. 1 and 2
Will raise any automobile with wheels 22 inches or over.
Height, 10 inches. Weight, 5 pounds.
Height, 11¾ inches. Weight, 6 pounds.
Can be worked at any angle or in cramped places.
Fits truss brace, round or square axle.
Price, No. 1, $2.50
Price, No. 2, $3.00
Atlas No. 2. Patent Applied For.

The U. S. Jack Co.
128 Lake Street, CHICAGO, ILL.
U. S. Jack No. 1 Patented July 10, 1906. Price, $2.50.

CORBIN

The "full jewelled" Corbin is distinctly the best $2500 value in the automobile world today.

Corbin Motor Vehicle Corporation
Member Association Licensed Automobile Mfrs.
New Britain - - - Conn.
NEW YORK BRANCH - 1779 Broadway

Wholesale THE Retail
Snutsel Auto Supply COMPANY
1534 Broadway (Times Square), N. Y. City
Everything for Electrical Ignition
Sole Agents for B. P. G. Ignition System
Sole Agents for Mestre & Blatge of Paris Accessories and Parts
Selling Agents for N. Y. for Rushmore Lamps and Searchlights
Import It will pay you to inquire Write for Catalog Dept. A. M. Domestic

AUTO TIRES
New and Second-Hand Tires Always in Stock
RECOVERING and REPAIRING a SPECIALTY
Call or write for price list
Broadway Rubber Tire Works
1900 BROADWAY
Telephone, 5381 Col. NEW YORK CITY

The IGNITION PROBLEM is SOLVED
in the "Lacoste" High Tension Magneto for Jump Spark Ignition
We guarantee this device to be absolutely perfect. We have done the experimenting.
No Batteries. No Coil. No Commutator.
Everything for Electrical Ignition.
LEON RUBAY, Sole U. S. Agt., 140 W. 38th St., N. Y.

STA-RITE
"STAYS RIGHT THE LONGEST"
Sta-Rite Plugs STAY RIGHT LONGER than all others because they have Double Porcelains, Non-Short circuiting air space, self packing joints, 47 Sizes. Porcelain, $1.50. Indestructible Mica, $1.75. Dynamos, Coils, Timers, etc.
THE R. E. HARDY CO., 86 Watts Street, New York City
126 Lake St., Chicago, Ill. E. J. Day & Co., Berkeley, Cal.

manship when the machines are repaired. Careless fixers bungle with the wrenches and rip off the threads. In one instance the mechanical party wound threads of cotton about the threads of the shaft, in order to increase the diameter to the oversized nut threads. Of course, the bungling job went to pieces in a little while and the machine was stranded on the road.

Sometimes deflected electrodes of both kinds get sprung and create trouble. Figure 8 is a drawing of one defect of this nature which came to our notice. It was found that the electrode had sprung to the extent of binding as at *f*, figure 8. In

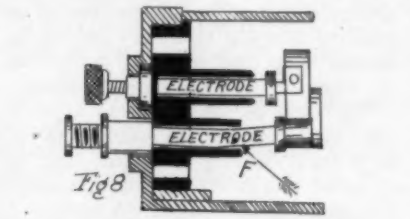


Fig 8

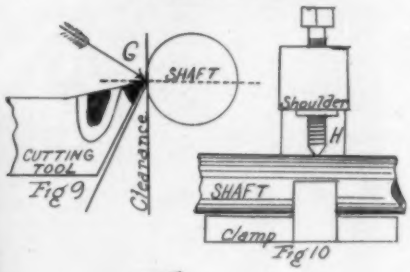


Fig 9 Fig 10

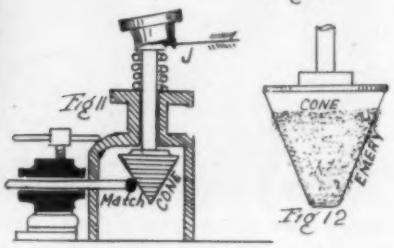


Fig 11 Fig 12

order to straighten the shaft, it was removed and various attempts made to accomplish the desired end. First the shaft was put in the lathe and trued by turning it. In order to trim down the high places, the cutting tool was brought into action as demonstrated at *g*, figure 9. When you put the end of the cutting tool on the hard steel of the electrode shaft, you want to be sure and have plenty of clearance, as shown, and likewise make sure of getting the line of the cutting point just a little below the center of the shaft, about as shown in the cut. Then, with the tool steadily supported, you can get quite a smooth and steady cutting edge. In order to have a means for supporting the shaft during the operation, you can use a home-made clamp of the order shown in figure 10. This consists of a piece of wrought iron worked over with a shoulder so as to afford means for the insertion of the set screw with the point *h*. This set screw point can be turned down through the shoulder upon the shaft as shown, thereby affording a means for gripping the shaft for turning or other work.

Figure 11 shows the form of corrugated cone often used in the match ignition for testing purposes. It is a good idea to have some of these different forms of igniters in stock and to practice with the same and work out ideas.

In the case of this match igniter, the head of the push shaft was fractured as at *j*. This was remedied by cutting a thread on the shaft and turning a nut on it, thus making a new head piece. Sometimes these cones are covered with emery, as in figure 12, instead of being corrugated.

"R."

Carnegie Proud of His Lowly Birth

Although nowadays there is scarcely a luxury which Andrew Carnegie can not afford to buy, he has not been infected with the snobbish spirit so common among our new rich, of searching for aristocratic ancestors. There was an outing of artisan people in Dumfermline, Mr. Carnegie's native town in Scotland, and the great patron of Winton cars wrote:

"By inheritance I think I would be entitled to rank myself with that ancient and honorable guild, for my Grandfather Carnegie and father were weavers in the olden days, and very proud of it. My Grandfather Morrison did not have the distinction, but he was a good shoemaker, and thought there was 'nothing like leather.' Even upon my own account I should have some claim to membership in the old weavers' society, for I remember well I assisted in 'giving in' threads to my father when he was 'putting in' in his web, and a very proud boy I was in doing so."

Mr. Carnegie is also very proud of being a member of the Mechanics and Tradesmen's Institute, of New York, to which no one is eligible unless he has earned his living by manual labor.

A Brooklyn Sunday school teacher had a talk with one of her small pupils while visiting him. "Now, Johnny," she said, "wouldn't you like to go to heaven? Johnny—"I don't know; but if it's a' the same to you I wid raythe go to Coney Island."

Automobile visitors to New York City will find the Lexington Hotel, just off Broadway on Forty-seventh street, a remarkably comfortable establishment at easy charges. The hotel is near the automobile garage district and there are all sorts of transportation facilities that can be taken to any part of the city. Take a note of this for reference.

CONTENTS

Florida Races, The 113
Evolution of the Car 114
Sensible Automobile Rules 114
Alcohol Test 115
Ocean Motor Boat Race 115
Electricity in Mining 115
Exchanging Club Courtesies 116
Gas Engines for the Navy 116
Seventh Annual Motor Car Exhibition at Chicago 117
*Autocars for 1907 119
General Correspondence 121
Automobile Accidents 122
*Testing a Maxwell Car 122
European Notes, News and Comments by A. F. Sinclair 123
Points in Gas Engine Design Frequently Overlooked, by E. W. Roberts, M. E. 124
Maintain Roads in Good Order 127
Winter Tours 128
Public Safety 128
Artificial Rubber 128
Information Bureau 130
Popular Engineering 131
Heat Electrically Produced 132
*Electrical Ignition Repairs 134
Fuel Value of Gasolene, Kerosene and Alcohol 136
Of Personal Interest 137
*Portrait of J. J. Worrell 137
Among Garages 145
Annual Meeting of A. M. C. M. Association 147
New Jersey Jottings 151
Motor Boat Show 153
*Hatfield "Buggyabout" 155
Carbureter that Produces Perfect Mixture 155
Gabriel Horn, The 155

People who have used gasolene readily appreciate the importance of having a first class storage tank. Fires and explosions result from the use of inferior tanks, to say nothing of the loss from evaporation. Those who use The Ideal Tank agree that the name describes its characteristics. The tank is absolutely airtight, yet it is self-ventilating—a sort of contradictory condition that has been very ingeniously worked out. Send to the Ideal Tank Works, Meadville, Pa., for their illustrated pamphlets, which explain the tank better than we can do.

An English tourist traveling in the north of Scotland, far away from anywhere, exclaimed to one of the natives, "Why, what do you do when any of you are ill? You can never get a doctor." "Na, sir," replied Sandy. "We've jist to dee a naitural death."

Fuel Value of Gasolene, Kerosene, and Alcohol

Particulars of the tests made by three Maxwell-Briscoe automobiles in a journey from New York to Boston burning gasolene, kerosene and alcohol respectively are very interesting.

The average number of miles per gallon of gasolene was 10 1-10 and by this standard comparisons with the alcohol and kerosene can be made. This average of 10 1-10 miles per gallon of gasolene must be considered good as the going was so bad that in some instances second speed had to be used in descending grades.

No adjustments were made during the entire trip and all carbureters were of the standard Maxwell type. No pre-heating devices being used in either the fuel or air, other than that regularly employed.

The object of the test being to show that one carbureter can handle successfully fuels differing in density and as such, the results are the more valuable. The following table gives in a condensed form the comparison of the fuel costs of the three cars:

Car.	Weight.	Cost per Gallon.	Total Consumption.
Gasolene ..	2,270	$0.20	24.75
Kerosene ..	2,520	0.13	33.75
Alcohol ...	2,750	0.37	40.75

Car.	Cost of Fuel.	Cost per Car Mile.	Cost per Ton Mile.
Gasolene ..	$4.95	$0.019	$0.0169
Kerosene ..	4.39	0.017	0.0139
Alcohol ...	15.07	0.06	0.0448

The miles per gallon of fuel are as follows:

Gasolene	10 1-10	miles.
Kerosene	7 4-10	"
Alcohol	6 13-100	"

From the above table it is seen that alcohol is about 2½ times as expensive as gasolene and over three times as expensive as kerosene when used in a gasolene engine of the present day.

The test has, however, shown that it is a good power producing fuel. The engine operating on alcohol pulled more strongly on hills than those operating on either kerosene or gasolene. In fact, it was almost impossible to stall the motor, the reason being that while the initial pressure with alcohol is less than with gasolene, the mean effective pressure is greater.

When I was young and tremendously modest I became very much embarrassed with a naive explanation given by a man about a personal deformity. I unexpectedly perceived the man standing a little distance away and my attention was attracted by the peculiar appearance of his nose. I kept gazing at him, and he looked up and quietly remarked, "It's leather." He had a leather nose.

"Juice" When You Need It

The APPLE BATTERY CHARGER is a dynamo right on your automobile or motor boat that keeps the battery always full of "juice." It provides a strong, ever-ready current of absolute evenness and insures your car or boat against being "put out of business" miles from home. Write to-day for full information to

The Dayton Electrical Mfg. Co., 170 St. Clair St., Dayton, O.

Enterprise Tire Repair Co.
F. HOLLISTER DEARBORN, Mgr.
67 W. 67th St. New York
Vulcanizing of every description.
Re-covering a specialty. All work guaranteed.

W. E. B. SPARK PLUG
Manufactured by
Arc-Spark Mfg. Co.
125 W. 32d Street
NEW YORK
Standard-$1.50-Metric
Write for
"The Man a-Motoring"

Automobile Tops
For all kinds and makes of Cars
The "NEVER RUB" Bow and Top Protectors
Will protect the bows and cloth from rubbing and wearing
SEND FOR DESCRIPTIVE CIRCULAR
SPRINGFIELD AUTO TOP & UPHOLSTERING CO.
102-106 Dwight Street
Springfield, Mass.

MENDENHALL'S ROAD MAPS
ROAD MAPS Specially designed and bound in pocket form for the use of Touring Automobilistst.
EASTERN—New York State, 75c.; New Jersey, 50c.; Pennsylvania, 50c.; Maryland and Delaware, 75c.
WESTERN—Ohio, 25c.; S.W. Ohio, 50c.; No. Ohio, 50c.; Indiana, 50c.; So. Indiana, 35c.; N. W. Indiana, (just out) $1; Illinois, 25c.; Michigan, 25c.; Iowa, 25c.; Missouri, 25c.; Wisconsin, 25c. Kentucky, 50c.
C. S. MENDENHALL, Publisher, Opera Place, Cincinnati, O

Of Personal Interest

Judge Vreeland, of Newark, N. J., is touring the Southern States in his Franklin.

Mr. William Edison is traveling from New York to the South in a special Premier touring car.

Mr. R. E. Clingan has accepted a position with the B-L M Motor Car Company, of Brooklyn.

Mr. C. F. Green has been appointed Michigan manager for the Witherbee Igniter Company.

Mr. F. D. Dorman has succeeded H. E. Randolph as secretary of the Maxwell-Briscoe Motor Company.

Mr. H. D. Moran has been appointed assistant manager of the Detroit branch of the Ford Motor Company.

Mr. Charles H. Semple has become president of the Empire Automobile Tire Company, of Trenton, N. J.

Mr. Thomas F. Walsh has purchased a 35-horsepower Fiat chassis, with town body, for use in Washington, D. C.

Mr. J. B. Murphree, formerly of East Orange, N. J., has gone to Jacksonville, Fla., to act as agent for the Franklin.

Fire Chief McConnell, of Buffalo, N. Y., is to have a big red touring car, so that he can make fast time answering alarms.

Mr. R. L. Kingston has severed his connection with the Harburg Tire Co. Mr. Frank G. Hill is the new sales manager.

Mr. A. L. Brown, formerly with the Nelson Morris Company, has become treasurer of the Tennant Motor, Ltd., of Chicago, Ill.

Colonel John Jacob Astor now has nineteen motor cars in his garage, and is reported as content with that number for the present.

Mr. Richard Croker, Jr., has purchased a forty-horsepower Rochet-Schneider automobile, with limousine body by Lamplugh.

Margherita, Dowager Queen of Italy, is touring Europe in an automobile that carries all her suite of seven, besides herself and her chauffeur.

Mr. F. R. Boynton has been appointed superintendent of the American Locomotive Automobile Company's factory, at Providence, R. I.

Mr. Bartlett J. Smith, who has learned the mechanical end of the S. & M. Simplex car, has just joined the Smith & Mabley sales forces.

Mr. A. L. Bennett, formerly sales manager for Cryder & Company, has joined the sales force of the New York branch of the American Mors.

Mr. L. E. Horton has been appointed manager of the Northwestern Cadillac Automobile Company, with headquarters at Minneapolis, Minn.

MR. J. J. WORRELL, SECRETARY RICHMOND COUNTY AUTO CLUB, NEW BRIGHTON, S. I.

Colonel Joseph Carter, of Cartersville, Virginia, passed through Philadelphia recently in his Locomobile. He is touring through the Middle States.

Mr. R. J. Schmunk has severed his connection with the White Company, and is now located in Boston as assistant manager of the Buck & Price Company.

Mr. Montgomery Hallowell, formerly on the staff of a Chicago newspaper, has been appointed advertising manager of the E. R. Thomas Motor Company.

Mr. M. M. Gilman, of Pittsburg, Pa., recently shipped a Welch, Type G, to Daytona, Florida, where it will be used in a touring expedition through the South.

Mr. B. F. Gooden has been appointed manager of the Mount Vernon Motor Car Company, of Baltimore, Md. The company is agent for the Autocar and Haynes.

Mr. Lewis Clark, president of the Autocar Company, of Ardmore, Pa., has gone to Palm Beach, Fla., where he has a beautiful bungalow for a winter home.

Mr. George A. Crane, formerly with the Knox Automobile Company, has been appointed manager of the Chicago branch of the Apperson Bros. Automobile Company.

Major C. J. S. Miller, of New York and Franklin, Pa., has purchased a 40-horsepower American Mors touring car, which he will use on an extended trip this season.

Mr. Charles B. Shanks, general sales manager of the Winton Motor Carriage Company, will shortly go to Florida to recuperate from the grip atmosphere of the show season.

Mr. Benjamin Briscoe, of the Maxwell-Briscoe Motor Company, has been elected chairman of the committee of management of the American Motor Car Manufacturers' Association.

Colonel John Jacob Astor has added to his fine list of automobiles a C. G. V. landaulet. This new acquisition was purchased from Wyckoff, Church & Partridge, New York.

Mr. R. Harry Croninger, formerly sales manager of the Stoddard-Dayton Company, has accepted a like position with the Pennsylvania Motor Car Company, of Bryn Mawr, Pa.

Mr. S. H. Stern, formerly manager of the Dac Auto Supply House, has been appointed manager for E. Lamberjack & Co., now sole American representatives of Michelin & Co.

It has been announced that Mr. R. W. Blake, formerly with the Knox Automobile Company, has joined the forces of the Pennsylvania Motor Car Company, of Bryn Mawr.

Mr. Thomas Cochran is now connected with the Keystone Automobile Company, of Pittsburg. Mr. Cochran was formerly manager of the East Liberty Automobile Company.

Healy Leather Tires

Do not PUNCTURE

Do not SKID

Do not RIM-CUT

Do not BLOW OUT

Healy Leather Tire Co.
88-90 Gold Street, New York City

UPTOWN BRANCH
1906 Broadway

Index to Advertisers

	Page.
The Aerocar Co.	3d Cover
American Industries	168
American Locomotive Auto Co.	3d Cover
The American Mercedes	134
American Motor League	—
Arc-Spark Mfg. Co.	136
Auto Club of America	—
Autocar Co.	146
Autocar Equipment Co.	—
Auto Chemical & Mfg. Co.	—
Automobile Institute, The	—
Badger Mfg. & Supply Co.	157
Badger Brass Mfg. Co.	158
Billings & Spencer Co.	—
Book Department	159
Boston Automobile Show	140
Broadway Rubber Tire Co.	135
Bullard, J. H., & Son	—
Cadillac Motor Co.	—
Carlough & Smith	—
Chandler Co.	—
Columbia Automobiles	—
Columbia Lubricants Co.	—
Condax, E. A., & Co.	165
Continental Cautchouc Co.	150
Corbin Motor Vehicle Co.	135
Correspondence School of Auto Engineering	—
Curtis, Harry	—
Darracq Motor Car Co.	—
Dayton Electrical Mfg. Co.	136
De Dietrich Import Co.	—
Derre-Clark Motor Car Co.	—
Detroit and Buffalo Steamboat Co.	—
Diamond Rubber Co.	—
Diezemann Shock Absorber	150
Dietz Co., R. E.	3d Cover
Dixon Crucible Co.	134
Duryea Power Co.	—
Eldredge Elec. Mfg. Co.	134
Electric Vehicle Co.	—
Elmore Mfg. Co.	—
Enterprise Tire & Repair Co.	136
Fickling & Co.	—
Firestone Tire & Rubber Co.	—
Fisk Rubber Co.	—
Ford Motor Company	—
Frayer-Miller	—
Funke & Co.	—
Gabriel Horn Mfg. Co.	—
Gas, Gasoline and Oil Engines	—
Graygood Shock Absorber	—
Hardy Co., R. E.	135
Hartford Suspension Co.	148
Haynes Automobile Co.	160
Healy Leather Tire Co.	138
Health Dry-Gas Co.	144
Heller, J. S.	—
Homan's Educator	—
Hotel Euclid	160
Herbert Hungerford	152
Information Bureau	—
Invader Oil Co.	164
Jeffrey & Co., Thomas B.	161
Jones Speedometer	148
Kilgore Auto Air Cushion Co.	—
Lexington Hotel	144
Locomobile Co. of America	—
Lobee Pump and Machinery Co.	—
Long & Mann Co.	162
Long Island Railroad	—
Manley, Chas. H.	—
Matheson, The	2d Cover
Maxwell-Briscoe Motor Co.	—
McGiehan Mfg. Co.	—
Mechanical Appliances	—
Mendalhall's Road Maps	136
Mercedes Import Co.	134
Meyrowitz, E. B.	—
Michelin Products Selling Co.	—
Miller, Chas E.	—
Motocar Co., The	164
Motor Directories Co.	166
Motor Vehicle Directory	146
Motor World, The	150
Mutty Co., L. J.	—
Napier Motor Co. of America	—
Nathan Novelty Mfg. Co.	—
New Jersey Central	—
New York Spring & Wire Co.	—
Niagara Motor Boat Co.	—
Northern Mfg. Co.	—
Ofeldt Boiler Co.	—
Oscar Lear Automobile Co.	—
Ocean Hotel	—
Pacific Tucking & Mfg. Co.	—
Palmer & Christie	—
Pierce Co., George N.	142
Pittsfield Spark Coil Co.	148
Pope Mfg. Co.	—
Portable Buffet Co.	—
Practical Gas Engineer	—
Quinby & Co., J. M.	—
Rambler Automobiles	161
Reliable Dayton Motor Car Co.	150
Rochester Auto Co.	—
Roever Co., Henry	—
Royal Motor Car Co.	105
Rubay, Leon	135
Sage's Trunk Depot, Inc.	150
Self Propelled Vehicles	—
Smith Mfg. Co., R. H.	144
Snutzel Auto Supply Co.	135
St. Louis Motor Car Co.	4th Cover
Splittdorf, C. F.	—
Sprague Umbrella Co.	—
Springfield Top and Upholstering Co.	136
St. John Rubber Tire Co.	—
Stearns Co., F. B.	154
Swineheart Clincher Tire & Rubber Co.	—
Thomas Motor Co., E. R.	—
Three Men in a Motor Car	—
Times Square Auto. Co.	—
Traction Tread Tires	2d Cover
United States Jack Co.	134
Vacuum Oil Co.	157
Warner Instrument Co.	163
W. E. B. Sparkplug	136
White Sewing Machine Co.	—
Willis Co., E. J.	—
Woods Motor Vehicle Co.	—
Young, O. W.	134

Mr. Frank L. Townsend, formerly the teller in the Haverhill (Mass.) National Bank, has become treasurer of the Geo. H. Lowe Company, the New England agents for the Aerocar.

Mr. J. B. Roosevelt, cousin of President Roosevelt, recently placed an order with Cryder & Company, New York, for a 45-60 horsepower French Mors, with double phaeton touring body, for early delivery.

Mrs. Stuyvesant Fish, wife of the former president of the Illinois Central Railway, and an enthusiastic motorist, says she still finds the auto of less importance than the planning of an attractive dinner.

Mr. A. S. Le Vino, who has been sales manager of the Ajax-Grieb Rubber Company, has resigned from the forces of the company. Mr. Le Vino will shortly be allied with a large automobile concern.

Mr. Nat Goodwin, the actor, has purchased a 50-horsepower Welch touring car, to be delivered to him at Los Angeles, in April. He will use it for traveling from one stand to another on the Pacific Coast.

With Andrew Carnegie's garage partly fitted with Winton automobiles and John D. Rockefeller purchasing a Packard, it cannot be said that our richest men fail to patronize their own country's manufactures.

Mr. J. E. MacDonald, of the Philadelphia branch of the Rambler, started recently on a tour of the South, to be gone two or three months, during which time he will visit all the principal cities of the Seaboard States.

Mr. N. P. Bernard, for seventeen years chief tester at the Pope factory, at Hartford, Conn., has become the manager of the garage of the Dodge Motor Car Company, the Boston agents for the Pope cars.

The following new members were elected to the Automobile Club of Philadelphia: H. S. Darlington, S. Boyer Davis, H. C. DuBois, William A. Fassnacht, Francis B. Morris, Ernest P. Tustin, Herbert N. Twells and John S. Whildin.

Mr. A. H. Atherton, of Lynn, Mass., recently made a long trip to North Abington, Mass. He found the roads in very poor condition from ice and snow, but experienced no trouble in going through with his Winton, Model K.

The resignation of Mr. C. W. Kelsey, sales manager of the Maxwell-Briscoe Motor Company, is announced, to take effect March 1. Mr. Kelsey recently returned from a European trip, and announces that he will go with a new company.

Mr. John D. Rockefeller had his new Packard car equipped with the Truffault-Hartford shock absorbers at the Hartford Suspension Company's factory recently. Mr. Rockefeller has used these shock absorbers on all his cars for the past three years.

Mr. Frank W. Lee, president of the A. Lee Chemical Works, Lawrence, Mass., enjoyed an extended and very successful automobile trip through Great Britain during the season of 1906. He covered over 5,000 miles of touring during that year, most of it being done on the other side of the Atlantic. The accompanying picture shows him with his Pope-Hartford car in front of the historic home of Shakespeare, at Stratford-on-Avon.

MR. FRANK W. LEE, OF NEW YORK, WITH HIS POPE-HARTFORD IN FRONT OF THE HOME OF SHAKESPEARE.

Dr. Edwin Steiner, of Newark, and bride, who were married in Oraton Hall, February 16, have gone on a honeymoon trip in an automobile. Dr. and Mrs. Steiner will go as far as Virginia, where they will take a train for a tour through the South.

Mr. Samuel Reed, of Indianapolis, Ind., recently purchased a Premier, Model "24," touring car, for his daughter, Miss Agnes Reed. Miss Reed has learned to drive her machine, and is contemplating making several trips over the country in the summer.

Mr. Jacob Dawson, one of the prominent members of the New Jersey Automobile and Motor Club, who has been Newark agent for the Rambler car, has become identified with Mr. J. W. Mason in the handling of the Stoddard-Dayton and the Maxwell cars.

Mr. G. S. Townsend, of Toronto, Canada, recently made a trip in his big touring car from that city to Buffalo. Accompanying Mr. Townsend on the run were Mrs. Townsend, Miss Farrell and R. W. Crashley. No snow was encountered on the entire run.

Mr. A. A. Marshall, of Fitchburg, Mass., recently drove a Winton, Type XIV, home from Boston, through ten inches of snow, with practically no broken track, in 3¼ hours. The car carried three passengers, and made the trip without a stop or adjustment.

The Motor Car Company of New Jersey recently delivered the following Packard cars: William F. Huffmann, J. Herbert Ballentine, and A. Lambert, all of Newark; Oscar J. Gubleman and Dr. M. Runyon, of South Orange, and W. S. Benson, of Passaic.

Dr. J. W. White, of the University of Pennsylvania, arrived last month with Mrs. White on the steamship Cedric, from Alexandria, Egypt, after having travelled sixteen hundred miles in Europe in an automobile. Dr. White said that in all his journey he had never had a serious breakdown.

Officers of the Colonial Automobile Club, of Pittsburg, have been elected as follows: President, H. W. Klein; secretary, H. N. Miller; treasurer, R. C. Succop. These, with the following, form the board of directors: Max Reinholdt, D. M. Miller, P. H. Mueller and J. H. Shaffer.

Mr. James Couzens, of the Ford Motor Company, who has been chairman of the committee of management of the American Motor Car Manufacturers' Association for the last two years, has declined re-election. He has been elected an honorary member of the committee of management.

Mr. and Mrs. Walter Hale, of Chicago, recently completed a tour in Europe in a Cleveland runabout. The car was driven from Gibraltar to Havre by the way of Paris, the Chatteau countries, Brittany, and the Normandy coast. Only two forced stops occurred, one of which was while fording a river, when water filled the carbureter, the other an irrepressible puncture.

STUPENDOUS AND WONDERFUL

Nothing like it—nothing equals it in the world. Acres and acres of Automobiles, Boats and Accessories. A Hundred Lady Musicians. Beautiful Decorations. Like doing business in an earthly paradise.

BOSTON AUTOMOBILE and POWER BOAT SHOW

TWO BUILDINGS CROWDED FULL—MECHANICS AND HORTICULTURAL

MARCH 9 to 16

CHESTER I. CAMPBELL, Mgr.
5 Park Sq., Boston, Mass.

At the annual meeting held last month at the Chicago Athletic Association, Mr. A. L. Riker was re-elected president of the mechanical branch of the Association of Licensed Automobile Manufacturers. The meeting was attended by many chief engineers of the leading automobile manufacturers.

Mr. Sidney Breese made a very fast trip to Philadelphia recently in a 24 horsepower B. L. & M. runabout. The entire trip took only four hours, in spite of the heavy snow. Considering the terrible condition of the roads, this time is remarkable, even for a car of such light weight, namely, 1,300 pounds.

Recent sales of Renaults reported by the C. A. Tileston Company, to prominent New York and Chicago people, are the following: Edwin Gould, Mrs. Daniel R. Hanna, William Nelson Cromwell, Norton F. Plant, William F. Sheehan, all of New York City, and William V. Kelly and J. Ogden Armour, of Chicago.

The Rhode Island Automobile Club has elected the following officers: President, W. Penn Mather; vice-president, Charles O. Read; treasurer, Howard D. Wilcox; secretary, Frank M. Barber; governors for three years, John R. Dennis and Charles A. Russell; for two years, Everett F. Boyden; for one year, Fred L. Smith.

Mr. F. A. Mahan having been appointed as attorney at Paris, France, by the Automobile Club of America, has arranged to look after the legal business of members of the club, and to facilitate the entry of their machines into France, and to secure the necessary papers for touring. His address is 51 Avenue Montaigne, Paris.

Mr. J. H. Linehan, of Pride's Crossing, recently drove a 1906, 35-40 horsepower Pope-Toledo out to Ferncroft Inn, through piles of mud and slush, with five passengers. His car was one of fourteen that made the trip that day, but had the distinction of being the only one that returned with the full load of passengers.

Countess Hoyes, of Fiume, Hungary, recently ordered a fully equipped twenty-horsepower, two-cylinder Maxwell car, which was shipped to her from Col. Pardee's New York agency. Countess Hoyes is a granddaughter of Whitehead, of torpedo fame, and is, accordingly, an American by descent. This order is significant of the progress that the American automobile manufacturer is making in competition with the European makers.

Baron Toronsuke Furukawa, of Japan, known as "The Rockefeller of Japan," has purchased a 50-horsepower Matheson touring car, as shown in the illustration herewith, to visit the various mines in which he is interested. He is taking a course in mining engineering at Columbia University, where he expects to remain until April 15, when he will sail for Japan.

TORONSUKE FURUKAWA, "THE ROCKEFELLER OF JAPAN," IN 1907 MATHESON, ACCOMPANIED BY RALPH MONGINI, ITALY; P. W. WILCOX, AMERICA, AND B. G. DREVES, FRANCE.

Mr. Warren Noble, chief engineer of the Matheson Company, of New York, will each week drive a new 1907 Matheson fresh from the factory, at Wilkes-Barre, Pa., over the entire route from that city to New York. This trip will be made with each car for the purpose of demonstrating its efficiency on a long run before it is delivered to the customer.

At a recent meeting of the New York Motor Club the following were elected to membership: E. E. Lowndes, J. T. Strauss, W. H. MacIllroy, M. G. Reynolds, C. H. Martin, E. H. Cox, Geo. McKesson Brown, Frank Webb, H. A. Lozier, J. F. Fairman, C. R. Mabley, H. H. Cobb, Marcus I. Brook, J. P. Gillroy, Carl Kaufman, Emil Grosman and W. G. Towner, Jr.

Mr. Joseph Tracy, the well-known driver and consulting engineer of the Dragon Automobile Company, gave a scientific talk on automobiles a short time ago, at the Hebrew Technical Institute, New York City. Some of the points which Mr. Tracy dwelt upon were most remarkably interesting to those present, speaking as he did from an entirely practical standpoint.

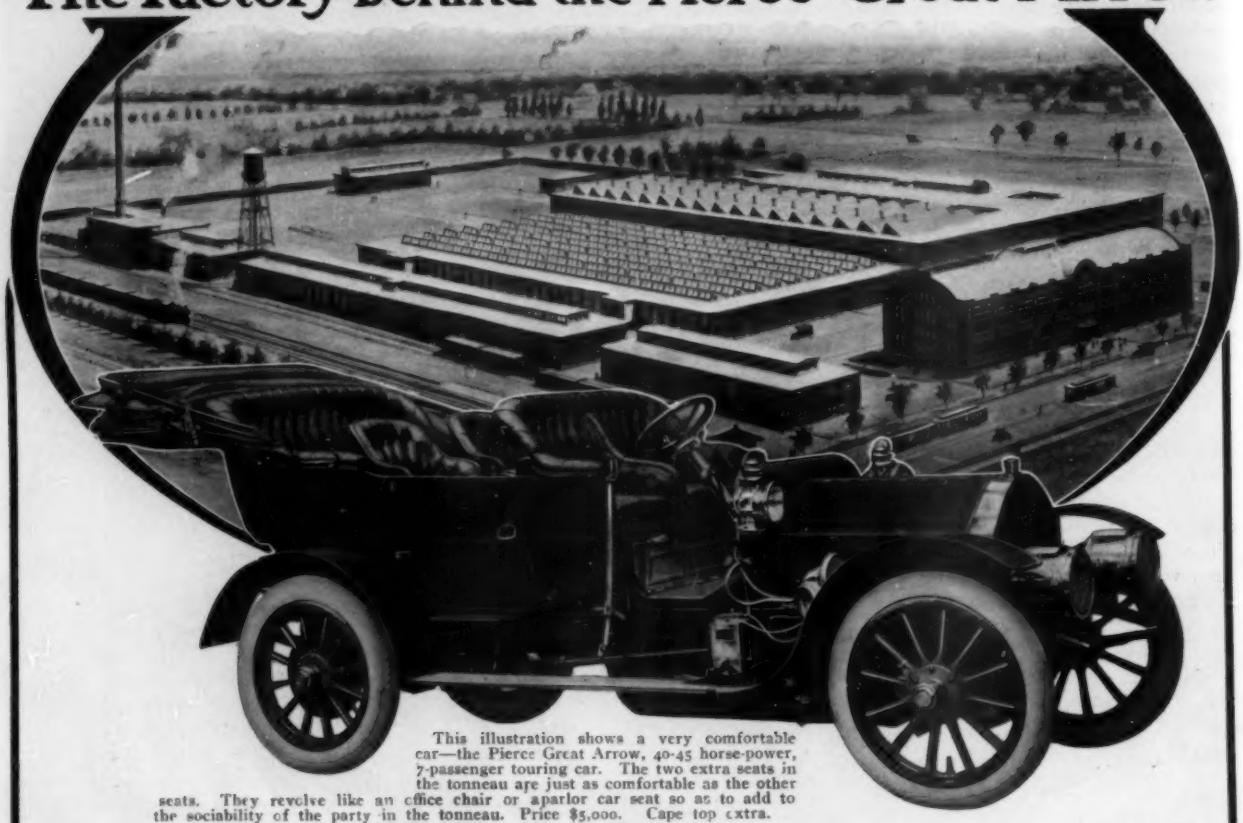
The Cumberland Valley Automobile Association has elected the following officers: President, Hon. E. W. Biddle, of Carlisle, Pa.; vice-president, Dr. P. R. Koons, of Mechanicsburg, Pa.; secretary, B. Le Roy Plank, of Carlisle, Pa.; treasurer, John H. Gardner, of Carlisle, Pa. The association has been invited to join with a Pittsburg association in some important legislative work.

Mrs. George Gould has purchased a Renault tourabout fitted with two small "bucket" seats. The car is for her own use, and she is the first American woman to become fascinated by this very racy type of car. The tourabout is growing in favor among wealthy men who are going in for high speed, but Mrs. Gould leads American women in recognizing the tourabout.

Among the recent sales made of Frayer-Miller cars are a 50-horsepower, four-cylinder, seven-passenger touring car to Mr. J. Koch, of Newark, N. J.; a six-cylinder limousine, to Mr. Dickson Ellis, of New York; a 50-horsepower, four-cylinder, seven-passenger touring car, to Mr. A. E. Dowler, of Staten Island; a 50-horsepower, seven-passenger touring car, to Dr. William E. Butler, of Brooklyn, N. Y.

President William H. Hotchkiss, of the American Automobile Association, recently announced the appointment of Mr Frank B. Hower, of Buffalo, N. Y., as chairman of the touring board of

"The Factory behind the Pierce Great Arrow"



This illustration shows a very comfortable car—the Pierce Great Arrow, 40-45 horse-power, 7-passenger touring car. The two extra seats in the tonneau are just as comfortable as the other seats. They revolve like an office chair or a parlor car seat so as to add to the sociability of the party in the tonneau. Price $5,000. Cape top extra.

THE real test of the Pierce car is not a perfect record in an exhibition contest like the Glidden Tour, but a perfect record over twice the amount of mileage in the hands of the owner.

Not for two or three weeks at a time, under ideal conditions, but all the time, under all conditions, and over all roads, the Pierce Arrow has proved itself the American car for American men.

Having produced a car satisfactory as the Pierce, it is up to us to produce a factory good enough and big enough to make the Pierce car as good as it has been in quantities to supply the demand. Hence the Pierce car is now backed up by a factory which we believe is the most complete and most satisfactory of its kind in the world.

The George N. Pierce Co.

Members of Association of Licensed Automobile Manufacturers.

BUFFALO, N. Y.

Pierce Dealers

J. W. Maguire Co.....745 Boylston St., Boston, Mass.
Harrolds Motor Car Co.....
.....Broadway, 58th-59th Sts., New York, N. Y.
H. Paulman & Co.....1430 Michigan Ave., Chicago, Ill.
Banker Brothers Co.....Baum and Beatty Sts., Pittsburg, Pa.
Foss-Hughes Motor Car Co..201 N. Broad St., Philadelphia, Pa.
Ellis Motor Car Co.....222 Halsey St., Newark, N. J.
Wm. E. Bush.....953 South Main St., Los Angeles, Cal.
Mobile Carriage Co.....
.....Golden Gate Ave. & Gough St., San Francisco, Cal.
Howard M. Covey.....Portland, Ore.
Broadway Auto Co., Inc.....
.....Broadway & Madison Sts., Seattle, Wash.
Tom Botterill.....1643 California St., Denver, Colo.
The George N. Pierce Co., Wholesale.....
.....762 Golden Gate Ave., San Francisco, Cal.
C. P. Joy Auto Co.....368 Minnesota St., St. Paul, Minn.
F. A. Nickerson Co.....642 Congress St., Portland, Me.
Pence Automobile Co...717 Hennepin Ave., Minneapolis, Minn.
J. P. Schneider.....187 Jefferson Ave., Detroit, Mich.
Metropolitan Motor Car Co.1841 Euclid Ave., N. E., Cleveland, O.
D. T. Williams Valve Co.....904 Broadway, Cincinnati, O.
Zorn-Strauss Co.....518 Third Ave., Louisville, Ky.
Western Automobile Co.....
.....4701 Washington Boulevard, St. Louis, Mo.
The Palace Auto Co.....1408 Walnut St. Kansas City, Mo.
Cook & Stoddard Co.....22d and P Sts., Washington, D. C.
Southern Auto Co...Mt. Royal and Maryland Aves., Baltimore, Md.
Central Auto Station Co.....92 Renne Ave., Pittsfield, Mass.
E. R. Clark Auto Co.....117 Lyman St., Springfield, Mass.
The Miner Garage Co....High and Allyn Sts., Hartford, Conn.
Wilson & Co.....117 Craig St., West, Montreal, Canada
Automobile & Supply Co..Ltd., 22 Temperance St., Toronto, Ont.
Hibbard Automobile Co.....187 Wisconsin St., Milwaukee, Wis.
Foss-Hughes Motor Car Co.....
.....512 Industrial Trust Bld., Providence, R. I.
U. S. Automobile Co....21 Plymouth Avenue, Rochester, N. Y.
Amos-Pierce Auto Co.....109 S. State St., Syracuse, N. Y.
Utica Motor Car Co.....Utica, N. Y.
Troy Automobile Exchange.....22 Fourth St., Troy, N. Y.
Standard Motor Car Co.....Scranton, Pa.
A. E. Lambert.....Titusville, Pa.
H. B. Doherty.....24 Wall St., Binghamton, N. Y.
Texas Automobile Co.....614 Milam St., Houston, Texas

the association for the current year. Mr. Hower is an enthusiastic motorist; is vice-president of the Automobile Club of Buffalo, of which he was one of the charter members, and is well qualified for this position, having rendered valuable service in connection with the management of the 1906 Glidden Tour.

Thirteen new names were added to the rolls of the Long Island Automobile Club at the meeting of the organization, held at the club house, in Cumberland street, Brooklyn, recently. The new members are C. G. Arnold, R. Benedict, E. H. Berry, M.D., T. F. Chyslei, J. A. Clarke, W. W. De Boise, E. W. Heatley, H. M. Palmer, E. E. Pierson, W. H. Redman, G. M. Robinson, S. B. Ross and J. H. Smart.

Mrs. John Jacob Astor is rapidly filling a garage of her own at "Ferncliff," the Astor estate at Rhinebeck. She has several electric cars, which she runs without any advice or aid from the Colonel. Now she is taking up the task of becoming proficient in the handling of high-powered gasoline automobiles. Only recently she added a handsome six-cylinder, thirty-horsepower landaulet to her horseless stable.

Among the recent purchasers of 1907 Pope-Hartfords cars were the following: David J. Post, Roy T. H. Barnes, Charles E. Shepard, James H. Brewster, General W. T. Fenn, Judge J. G. Calhoun, Benedict M. Holden, Frederick W. Arnold, E. F. McKernan, W. H. Plimpton, Dudley Hubbard, Charles D. Griffith, William Storrs, E. J. Blake, E. A. Bardol, George W. Christoph, Francis T. Maxwell, David A. Spear and John Morrell, all of Hartford, Conn.

Miss Frances McCardell, the fourteen-year-old daughter of Roy L. McCardell, of New Rochelle, N. Y., recently won the prize automobile offered by the Cadillac Company to the owner of a Cadillac car that could show the most satisfactory service. Miss McCardell's car was selected as the best from a large list. Miss McCardell has been running her car every day for four seasons, including a 2,000-mile tour which she took with her parents in the summer of 1905.

Automobile owners of Williamsport, Pa., and vicinity met a short time ago and organized a Lycoming County Automobile Club, with forty charter members and as many more applications for membership. A costly club house will be erected near a pleasant retreat several miles from the city. The following officers were elected: President, James B. Krause; vice-president, C. La Rue Munson; treasurer, Charles D. Wolfe; secretary, F. Grant Sweet; captain, J. Walton Bowman.

At a meeting of the Quaker City Motor Club, held last month at the club's headquarters, at the Hotel Majestic, the following officers were elected: Charles J. Swain, president; George H. Smith, vice-president; C. C. Fitler, Jr., second vice-president; A. T. Stewart, treasurer; T. B. Creamer, secretary, and Nathaniel Hathaway, E. Hubbard Fitch, G. H. Gantert, A. E. Maltby, G. Douglass Bartlett, E. C. Leeds, W. Wayne Davis, E. C. Johnson and L. D. Berger for the board of governors.

Mr. Henry Ford left Detroit a short time ago for California, in one of his big six-cylinder cars, where he will spend a month or so in viewing the beauties of the Golden State in midwinter. This is Mr. Ford's first trip to the Pacific Coast. He is accompanied by Mrs. Ford, his twelve-year-old son, Master Edsel, and Mrs. Ford's parents. The party will tour California from San Francisco south to San Diego, stopping en route at the quaint old Spanish missions and other interesting and picturesque places.

Mr. Arthur H. Robbins, formerly connected with the H. H. Franklin Mfg. Co., has succeeded Percy Owen as manager of the New York branch of the Aerocar Company. Mr. Robbins has been connected with the Ford and the Pope companies, and is, therefore, well acquainted in automobile trade circles. He is planning an active campaign, and will undoubtedly increase the popularity already gained by the Aerocar throughout the Eastern States. Mr. Owen recently withdrew to form the Percy Owen Motor Car Company, in New York City.

The Motor Club of Harrisburg, Pa., was permanently organized last month, with the following officers: President, Vance C. McCormick; first vice-president, Oscar C. Robertson; second vice-president, Ralph R. Buvinger; third vice-president, Charles C. Cumbler; secretary, J. Sidney Sible; treasurer, John C. Nissley. Beside the above officers a board of governors was elected to look after the club's interests. The board consists of Dr. John Oenslager, Herbert F. Rawll, C. G. Nissley, James A. Bell, James McCormick, Jr., Roy Senseman, R. A. Stees, Howard Jenkins and Frederick D. Carney.

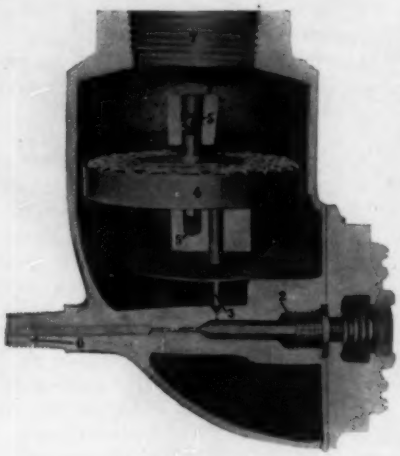
The A. G. Southworth Company, which handles the Pope line in New York and Brooklyn, report the following recent sales of 1907 cars: Pope-Toledos—A. J. Lester, M. J. Warner, Robert R. Sizer, Frank Bradley, L. E. Raff, H. S. Kermer, A. S. Thompson and W. G. Bushnell. Pope-Hartfords—S. Townsend Titus, Augustus H. Sell, F. A. Merriam, Frank A. Kately, James H. Ottley, A. E. Fountain, Edward A. Choate, A. B. Gaines, T. W. Decker, Henry H. Cone, W. T. Mertz, Hammond Talbot, Walter S. Benedict, Augustus Cheesebrough, H. C. Record and Charles T. Obermeyer.

The following names have been proposed to active membership in the Automobile Club of America: Frederick P. Addicks, New York City; Quincy Ward Boese, New York City; George W. Dickinson, New York City; Albert H. Harris, New York City; Austin P. Palmer, Brooklyn, N. Y.; Henry U. Palmer, Brooklyn, N. Y. For associate membership: Herbert M. Sears, Boston, Mass.; H. Carroll Brown, Baltimore, Md.; W. Evan Chipman, Easton, Pa.; Philip S. Dyer, Easton, Pa.

William Ewart Gladstone, the famous British Prime Minister, was a good example of how industry and perseverance will overcome natural deficiencies. When young Gladstone was a boy at Eton, a celebrated school, the head teacher declared that he was the stupidest boy in learning figuring that had ever been in the school. Yet Gladstone developed amazing faculty with figures. When he was Chancellor of the Exchequer, which is equivalent to our Secretary of State, he would talk for three hours explaining his budget, which is the annual financial statement, dealing with vast sums all the time, and his speech would be delivered without notes.

Mr. Jefferson DeMont Thompson, who was re-appointed chairman of the racing board of the American Automobile Association by President William H. Hotchkiss, recently announced the names of the members of his board for the current year. His appointees are William K. Vanderbilt, Jr., E. Russell Thomas, Dave Hennen Morris, A. G. Batchelder and S. M. Butler, all of New York City; A. R. Pardington and Frank G. Webb, of Brooklyn; R. Lincoln Lippitt, of Providence, and George L. Weiss, or Cleveland. The technical advisors to the board are Henry Ford, of Detroit; A. L. Riker, of Bridgeport; E. R. Thomas, of Buffalo, and J. J. Mann, of Paris, France. Frederick H. Elliott, secretary of the A. A. A., will act in a like capacity for the racing board.

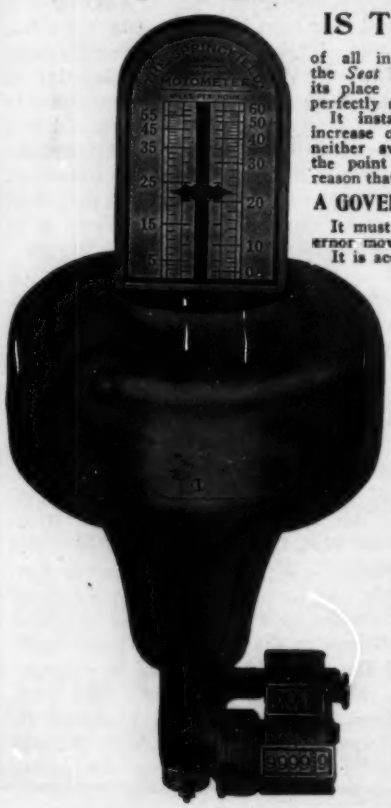
"The Carbureter That Carburets"



The difference between a Carbureter that CARBURETS and one that simply feeds gasoline and air FOR THE ENGINE TO CARBURET is the difference between PERFECT and IMPERFECT engine operation.

HEATH DRY-GAS CO., 1937 Broadway, New York

The Springfield Motometer



IS THE EASIEST

of all instruments to *Read* from the *Seat* because the Pointer takes its place on the dial and remains perfectly steady.

It instantly shows the slightest increase or decrease of speed, but neither swings nor dances around the point it is indicating, for the reason that it is directly connected to

A GOVERNOR THAT GOVERNS

It must move exactly as the governor moves.

It is accurate and reliable because correctly constructed.

Every motion is balanced.

All working parts are of steel with hardened self-lubricating bearings.

A fine piece of mechanism which meets the approval of the mechanical experts.

It is covered by a business-like guarantee.

The Price Is Right—Fair To Us, Fair To You

You can put in more money, but you can't buy better service.

For any sized wheel and fittings for any car.

50 Mile Instrument, combining Trip and Season Odometer, $45.00.

60 Mile Instrument, combining Trip and Season Odometer, $50.00.

Either size, without Odometer $10.00 less.

WE CAN NOW MAKE IMMEDIATE DELIVERIES

The R. H. Smith Manufacturing Company

Patentees and Manufacturers

SPRINGFIELD, MASS.

Est. 1865. Inc. 1883

Lexington Hotel

JUST OFF BROADWAY ON 47th STREET, WEST, AND LONGACRE SQUARE

NEW YORK

OPENED JAN. 1906

Absolutely Fireproof

Unsurpassed Apartments

324 Rooms with Private Baths

HIGH CLASS, UP-TO-DATE HOTEL

$1.50 PER DAY AND UP

European Plan

Within Five Minutes Walk of Eight Theatres

SEND FOR SOUVENIR POSTAL CARDS

GEO. R. JONES & SONS

Among Garages

Doud Brothers, automobile dealers in Chatsworth, Ill., are to build a new garage.

The Oriental Garage has been opened at Arlington and Wakeman avenues, Newark, N. J.

Mr. A. W. Gallander, of 627 Front street, Fort Madison, Ia., is building a one-story garage, 50 by 90 feet.

Mr. Charles Kerbeck is to build a two-story rear addition to the garage on Ridge avenue, Philadelphia, Pa.

The Garland Motor Car Company, Lansing, Mich, have filed articles of incorporation. The capital is $50,000.

A new garage is being built for the Reliable Automobile Company, at Pacific avenue and Seventh street, Tacoma, Wash.

Mr. Ralph B. Hain has purchased the automobile exchange business and garage at 117 West Sixteenth street, Los Angeles, Cal.

The Houston Motor Car Company, of Houston, Tex., have completed their new garage, 50 by 125 feet, at 410 San Jacinto street.

The Colonial Automobile Company, of 3946 Olive street, St. Louis, Mo., are building a 50 by 150 two-story addition to their garage.

The Citizens' Motor Car Company, of Cincinnati, Ohio, will erect a large garage at Seventh and Main streets, at a cost of $100,000.

The Hudson Valley Construction Company have been granted the contract for the erection of the West garage at Saratoga, N. Y.

A salesroom and garage is to be constructed in Galesburg, Ill., at 224 South Chambers street, by Hobbie & Martin, a new firm just organized.

An automobile garage, 60 by 100 feet, is being built on Richards street, Salt Lake City, Utah. The structure will be two stories in height, and will cost $4,500.

The V. S. Darling Company, of Auburn, Me., expect to have their new garage, 40 by 70 feet, completed and occupied by the first of March.

Plans are being drawn by Mr. R. L. Landeer for the construction of an automobile garage at the corner of Third and Ash streets, San Diego, Cal.

The Ellis Motor Car Co., Newark, N. J., have taken the agency for the Knox cars. It will be handled in connection with the Pierce-Arrow.

Mr. Jos. Libal has purchased the three-story building at Halsted street and Briar place, Chicago, Ill., and has fitted it as a garage and salesroom.

The Nevada Automobile Supply Company, of Goldfield, Nev., have moved into their new garage and repair shop, a building 60 by 100 feet, on main street.

H. Campton, R. B. Edwards and F. W. DeCamp have organized the Pope Auto Company, of Newark, N. J., to manufacture automobiles, etc. Capital, $25,000.

The Lozier Motor Company have just secured, in Newark, N. J., the Linkroum-Smolsor Automobile Company as agents in that vicinity for the Lozier motor car.

The Imperial Motor Company, of Buffalo, N. Y., have filed plans for a two-story brick store and garage to be built at No. 1094 Main street, at a cost of $30,000.

The Livezey-Pionnie Motor Car Company have opened a garage at 136 South Eleventh street, Newark, N. J. The concern will handle a number of high-grade cars.

The Northampton (Mass.) Garage Company have filed articles of incorporation. Capital, $5,000. President, Eugene E. Davis; treasurer and clerk, Leo H. Porter.

Wing Brothers, proprietors of the American Automobile Company, Tacoma, Wash., have moved into their modern concrete garage, at 204 St. Helen's avenue.

Articles of incorporation of F. F. Rick Company, of Buffalo, N. Y., have been filed. The company will manufacture motor vehicles, etc. The capitalization is $10,000. The incorporators are Frederick F. Rick, Otto Rick and Thomas A. Rick, of Buffalo.

The Philadelphia Motor Car Company, of Philadelphia, have been incorporated. They purpose to manufacture and deal in motor cars of all kinds. Capital, $500,000.

G. W. Parkin & Son will shortly erect a garage at Broad and Boston avenue, Philadelphia, Pa. The building will be two stories in height and will cover an area of 50 x 100 feet.

The Dorris Company, of New Jersey, have been organized in Newark, for the purpose of handling the Dorris car. Mr. A. T. Purcell has been appointed manager for the concern.

Ocean-going garages operated by the trans-Atlantic steamship lines will, in the opinion of experts, be an outcome of the great and growing traffic made by automobile touring abroad.

The following have secured the agency for the Carter car: W. E. Faber & Company, Chicago, Ill.; Smith Auto Company, Denver, Colo.; New York Auto Company, Utica, N. Y.

The Paddon Motor Company, of Boston, Mass., have filed articles of incorporation. The capital is $40,000. The incorporators are John W. Paddon, Arthur E. Wood and Bert F. Borhek.

FINE TOURING COUNTRY IN THE SCOTTISH HIGHLANDS.

Autocar Reliability

Mechanical Efficiency **Unfailing Power** **Ease of Control** **Accessibility**

is builded on the very groundwork of scientific motor car construction. Mechanical efficiency is secured by the use of the best materials, skilled workmanship in a modern, well-equipped factory, and a thorough system of tests which no imperfection can pass. To these are added special Autocar features, such as Autocar control and Autocar accessibility. The sum total is Reliability—a car that is reliable in every way. Write for The Autocar Book.

Limousine and Landaulet for immediate delivery, $3,500

The Autocar Co

Member Ass'n Licensed Automobile M'f'rs.

Ninth St., ARDMORE, PA.

Type XIV, 30 h. p., $3,000

Three point unit suspension of power plant. 4 vertical cylinders. Sliding gear, roller-bearing transmission. Three speeds and reverse. Direct drive.

The Autocar

14,000 NAMES OF THE BEST CLASS OF PEOPLE $1.00

Automobile License Directory of Pennsylvania Contains

NUMBERS, NAMES AND ADDRESSES,
ALPHABETICAL LIST OF NAMES, and
LAWS OF PENNSYLVANIA PERTAINING TO MOTOR VEHICLES

The Pennsylvania Motor-Vehicle Register,

Published monthly, beginning February 1st, 1907, will contain

LIST OF NEW LICENSES OF PENNSYLVANIA,
LAWS, ORDINANCES, and
INTERESTING TOURS OF PENNSYLVANIA.

A valuable publication to all Autoists, Drivers, Cyclers, Garages, Dealers and Manufacturers

AGENTS WANTED. ADVERTISING RATES ON APPLICATION

SUBSCRIPTION BLANK

THE REGISTER PUBLISHING CO., Date.....
3606 Hamilton St., Philadelphia, Pa.

Please enter my subscription to The Motor Vehicle Register, beginning February, 1907, for which I enclose
$5.00 for one year or
$2.50 for six months.

Name.....

Address.....

The Lucey Motor Car Company, of Troy, N. Y., was incorporated recently, with a capital stock of $10,000. The directors are Edgar T. Chapman, D. M. McDermott and Fred Kavanaugh.

Mr. J. Lansing Crouse, formerly a sales agent for the H. H. Franklin Manufacturing Company, has secured the agency for the Maxwell car in Syracuse, N. Y., and will open a garage.

Mr. J. H. Gorman has leased the Bannan property, at Railroad street and Howard avenue, Pottsville, Pa., and will fit it up for a garage and repair shop, and will also have automobiles to hire.

The Auto Garage and Repair Company, of Paterson, N. J., was incorporated to repair automobiles, etc. Capital, $25,000. Incorporators are G. B. Hackett and J. D. Lewis, of Paterson.

A new two-story garage, 40 by 80 feet, is to be erected in Allegheny, Pa., by the Park Garage Company. The structure, which is to be fireproof throughout, is expected to be ready for occupancy by April 1.

The Winton Motor Carriage Co. are having a fireproof garage built on Beatty street, East End, Pittsburg, Pa., at a cost of $30,000. It is to be one of the best and most complete buildings in the city.

The Roosevelt Automobile Company, of Rahway, N. J., have filed articles of incorporation. The capital is $50,000. The incorporators are Robert L. Bracher, Howard Pendleton and Walter A. Reason.

The people who christened the "Devac" car, of Newark, N. J., displayed considerable ingenuity. Every letter begins a word that has a significance for automobilists, viz.: Double explosion, valveless, air cooled.

The Lombard Instrument Company, Boston, Mass., have incorporated, to deal in motor vehicles and supplies, with a capital of $50,000. The directors are Lewis W. Lombard, David W. Dunn and Herbert E. McClain.

The Berks Auto and Garage Company, of Reading, Pa., are erecting a model garage on Cherry street, near Fifth, and will engage in a general automobile business in addition to carrying the agency for the Jackson car.

A garage large enough to store 200 automobiles will soon be built by Close Brothers, at Schenectady, N. Y., at a cost exceeding $30,000. The building will be a two-story brick affair, 39 by 180 feet, and will be fireproof throughout.

A new garage has been opened by the Universal Automobile Company, at St. John and Olive streets, New Haven, Conn. The garage is fitted throughout in first-class style, and has accommodation for two hundred cars.

The Evans Motor Car Company, of Minneapolis, Minn., have contracted for the construction of a new garage and salesroom at 510 Second avenue. The new building will be 36 by 100 feet, and it is expected to be completed by March 1.

The United Motor Car Company, of Cleveland, Ohio, recently incorporated with a capital of $25,000, to handle the Dragon automobiles, elected officers last month. Emory Carhart was elected president, and M. L. Sampliner, secretary and treasurer.

Mr. C. W. Moody, formerly with the B. F. Goodrich Company, has opened a branch for the Pennsylvania Rubber Company at No. 2134 East Ninth street, Cleveland, Ohio. The branch is showing a complete line of automobile tires and mechanical rubber goods.

Mr. Charles B. Canburn has begun work on a two-story stable and automobile garage, 20 by 44 feet, with a rear wing 42 by 66 feet, on Chestnut street, Philadelphia, Pa., for Mr. Morris Williams. The building will be of stone and will cost $4,500.

Rialto Automobile Exchange, of New York, have been incorporated to manufacture, store and rent automobiles, and also to instruct chauffeurs. Capital, $2,000. The directors are Harold J. Siegel, Tracey L. Freeman and Samuel Leibovitz, all of New York.

The Pacific Coast Automobile Company, of Seattle, Wash., are to construct a magnificient new garage in the near future. Manager Gaffney states that it will be one of the finest and most complete in the West, and will be ready for occupancy some time in March.

Borough President Coler, of Brooklyn, has asked the Board of Estimate to appropriate $6,000 for the construction of a municipal garage, in which to house the autos in the borough's service. He wants the garage located on the bridge property north of Tillary street and west of Washington.

The Stearns car will be handled at Los Angeles, Cal., by A. H. Braley, whose present address is 400 South Spring street. The Stearns has proved very popular on the Coast, where the hill-climbing qualities, for which it has become famous, are appreciated in the highest degree.

Articles of incorporation have been filed by Hoyt & De Mallie, of New York. They purpose to manufacture electrical vehicles, etc. Capital, $75,000. The incorporators are Peter V. Hoyt and James M. De Mallie, both of New York City, and Clarence A. Wilson, of Passaic, N. J.

The Rees Company, of New York, have been incorporated to manufacture and repair automobiles, etc. Capital, $120,000. Incorporators are John J. Karniol, No. 52 Broadway; Royal E. Fox, Jr., No. 100 Broadway; William Rickard, No. 52 West 104th street; Albert B. Foose, No. 29 Broadway, all of New York, and others.

Thomas S. Witherbee, former president of the Witherbee Igniter Company, has severed his connection with that company, and has organized a new company to be known as the Witherbee Manufacturing Company, with factory and offices at No. 433 West Forty-second street, for the purpose of manufacturing an automobile battery of his own invention.

Mr. M. H. Gulesian has leased to the Boston Automobile Renting Company, for a term of five years, a quarter section in his new garage, in process of erection on Irvington and Harcourt streets, Boston, Mass., to be known as Copley Square garage. This building will be strictly fireproof throughout, and will be completed on or before the first day of June next.

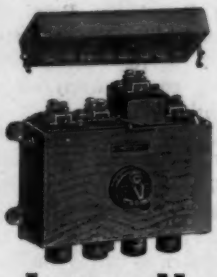
The Liberty Automobile Company, of Pittsburg, Pa., are erecting a new garage and salesroom on Beatty street. The garage, which will be completed in April, will be 120 feet in length by 80 feet in depth. It will be two stories in height, with the offices on the second floor. The floors will be of concrete, and built with a view to repair work, cleaning, etc. The building will be absolutely fireproof.

The H. H. Franklin Manufacturing Company have arranged for quarters in the building belonging to Wright Bros., in East Pearl street, Syracuse, N. Y., for storage purposes. This was necessary because more machines are being built than the railroads can furnish cars for at present, and many machines will have to be stored until the shipments can be made. From 7,000 to 8,000 feet of floor space will be used in the building for storage purposes.

Negotiations are under way for the

PITTSFIELD SPARK COIL CO.

MANUFACTURERS OF



Coils
Timing Devices
Switches
Jewell Mica Plugs
Terminals
Etc.

Our Coil is the most rapid, economical in battery consumption, most durable and reliable made in the world. Used exclusively by several of the largest and best automobile manufacturers in the country.

The Franklin Car, which recently won the Economy Test, was equipped with our entire Ignition Outfit — Coils, Timing Devices, Switches and Pluge

All we ask is an unprejudiced test to prove to you that our goods are what we claim

Automobile owners who have ignition troubles would do well to test this Coil

Write for prices and description of our 1907 Ignition Products

Pittsfield Spark Coil Co.

PITTSFIELD, MASS.

The DIAL of the "JONES"

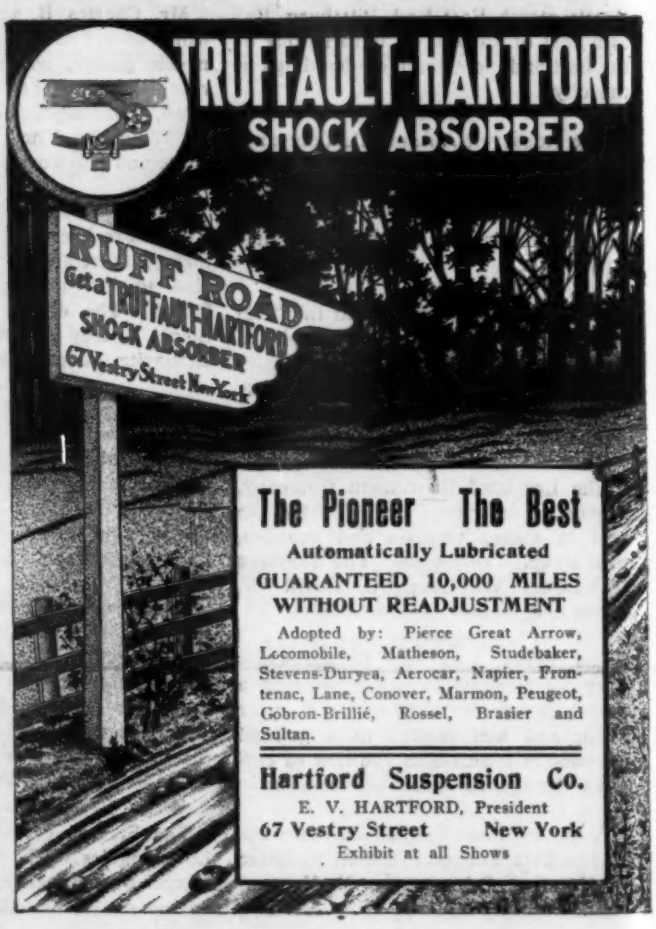
is the **Easiest to read** of all Speedometers. The figures and the indicating hand are large, plain and black.

The speed may be read at a greater distance than from any other instrument—and **from any angle.** Meters with moving dials and complicated markings can not be read unless one is directly in front of them. The

JONES SPEEDOMETER

is OF USE TO EVERY ONE in the Motor Car—it is not designed for the exclusive benefit of the chauffeur.

JONES SPEEDOMETER COMPANY
123 West 32nd Street
New York



The Pioneer The Best

Automatically Lubricated

GUARANTEED 10,000 MILES WITHOUT READJUSTMENT

Adopted by: Pierce Great Arrow, Locomobile, Matheson, Studebaker, Stevens-Duryea, Aerocar, Napier, Frontenac, Lane, Conover, Marmon, Peugeot, Gobron-Brillié, Rossel, Brasier and Sultan.

Hartford Suspension Co.

E. V. HARTFORD, President
67 Vestry Street New York
Exhibit at all Shows

rental by the Franklin Company of a large part of the plant of the Stearns Steam Carriage Company. If this is done the Franklin Company will do part of its work there so as to give more room in the main factory.

The Automobile Club of America, supported by many car owners, is now working to induce these lines to ship cars without expensive crating.

When asked for his opinion, Edward Weinacht, vice-president and general manager of the Morris European express, a subsidiary company of the Adams Express Company, which transports many machines for owners, said:

"I believe that ultimately the fast lines will make provision for carrying uncrated automobiles, in order to attract passenger traffic. The automobilist who travels with a machine generally takes expensive accommodations—not a single berth—but a room or suite of rooms. He is able to pay for good accommodations, as is evidenced by the fact that he takes his machine and his chauffeur with him.

"Steamships, to carry uncrated machines, would have to change their present method of stowing freight, and provide a separate compartment for uncrated machines. I have no doubt that to-day, if the automobilists of the country would guarantee to fill such a compartment on every trip, the steamship lines would be willing to set aside such space for uncrated machines."

Within the past few months the H. W. Johns-Manville Co., of New York, manufacturers of asbestos products, have opened new branches at New Orleans, Dallas and Baltimore, so that the company now has sixteen branches throughout the United States, besides innumerable local representatives at various points. The business of the company in the city and vicinity of Buffalo has now reached such proportions that a new branch has just been opened at 214 Maint street, Buffalo. This branch consists of a large retail store, offices and warerooms, and will be under the management of Mr. Geo. A. Schmidt, who for a number of years was connected with the Manville Covering Co., Milwaukee, which company is now a part of the H. W. Johns-Manville Co. Mr. Schmidt is well known throughout that section, having until recently been in charge of a special department of the W. A. Case & Sons Manufacturing Co., Buffalo, who until recently were the Buffalo agents of the H. W. Johns-Manville Co. Mr. B. F. Boscoe has been appointed assistant manager of this branch, and will make his headquarters in Rochester. Mr. Harry V. Patton, formerly manager for a local asbestos house, will also be associated with the new Buffalo branch.

New Gas Engine Company

The Dubois Iron Works Company, of Dubois, Pa., has taken over the entire business of the Lazier Mfg. Co., of Buffalo, N. Y., and in addition to their extensive manufacture of their justly celebrated steam pumps and other machinery special enlarged facilities are being established to meet the rapidly increasing demand for gas and gasolene engines. The company has secured complete control of the patents and designs of the Lazier Company, and the output will henceforth be known as the Dubois engines. Several improvements are being added to the already fine engine, and it is now possible to operate them on natural, illuminating, coke oven gas, gasoline, alcohol, distillate, crude oil and kerosene, in sizes ranging from 5 horsepower to 300 horsepower. They are easily in the front rank of horizontal gas engines.

VICTORIA FALLS FROM AN OLD WOOD CUT IN THE "WORLD OF WONDERS."

The officers of the company are Mr. John E. Dubois, president; Mr. W. C. Pentz, vice-president; Mr. E. A. Badger, secretary and treasurer, with Mr. I. N. Hamilton as general manager. The sales and advertising department will be in the hands of Mr. C. E. Stuart.

Many reputed great men are more indebted to their biographers than to their own deeds for the world's impression of their greatness.

Annual Meeting of A. M. C. M. Association

The annual meeting of the American Motor Car Manufacturers' Association was held in Chicago early last month. The annual report of James Conzens, retiring chairman, showed that the association has nearly doubled its membership in the last eight months, there being forty automobile manufacturers in the organization. Three members were elected to serve three years on the committee of management: R. E. Olds, Reo Motor Car Company; H. O. Smith, Premier Motor Manufacturing Company, and Benjamin Briscoe, Maxwell-Briscoe Motor Company. Roger J. Sullivan, of the Wayne Automobile Company, was selected to fill the vacancy on the committee caused by the resignation of A. C. Newby, of the National Motor Vehicle Company.

The committee of management held a session after the conclusion of the annual meeting, when officers for the ensuing year were elected as follows: Chairman, Benjamin Briscoe; vice-chairman, R. E. Olds; treasurer, H. O. Smith; auditor, Roger J. Sullivan, and general manager, Alfred Reeves.

Successful Snow Fighters

The severe winter weather that has prevailed in a large area of the United States during the months of January and February has demonstrated that powerful automobiles can push through deep snow at times when all other forms of locomotion are suspended. We have received numerous letters giving particulars of difficulties overcome, and claiming special merits for different cars as snow fighters. From long experience pushing through snow in other vehicles, our judgment is that given a high-set car, with plenty of power, it will display about the same performance as any other car of the same character.

End of the Argument

A group of workmen were arguing during the dinner hour. A deadlock had been reached when one of the men on the losing side turned to a mate who had remained silent during the the whole of the debate.

"'Ere, Bill," he said, "you're pretty good at a hargymen. Wot's your opinion?"

"I ain't a-going to say," said Bill. "I thrashed the matter out afore with Dick Grey."

"Ah!" said the other, artfully, hoping to entice him into the fray, "and what did you arrive at?"

"Well, e-venchually," said Bill, "Dick 'e arrived at the 'orspital an' I arrived at the perlice station!"

"Keep your eye on Continentals!"

Continental TIRES

Standard all over the world

Continental Caoutchouc Co.

J. M. GILBERT, General Manager

Representation Everywhere

43 Warren Street NEW YORK

MOTORING

in the Old Country 'specially Scotland

The Motor World

is Smart, Up to Date and Profusely Illustrated

Chronicles Every Movement

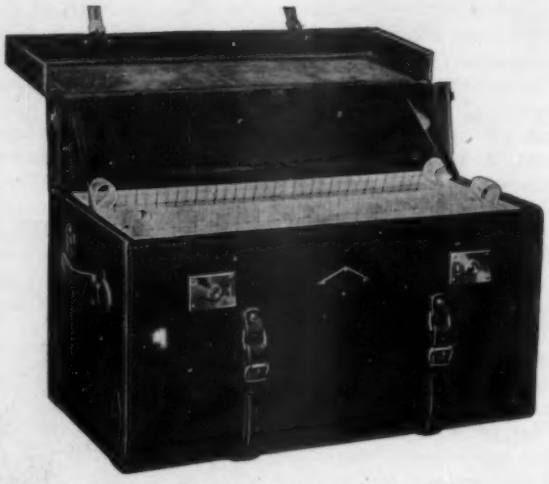
in the Trade and Sport. To be well informed on progress in Scotland, England and Ireland read The Motor World

Annual Subscription $2.00

HAY, NISBET & CO., Limited

73 Dunlop Street, GLASGOW, SCOTLAND

SAGE'S AUTO TRUNKS



We make trunks to fit all leading styles of automobiles.

Made on steel frame, hand sewed and riveted, and are guaranteed dust and water-proof.

Write for catalogue, naming make of your car.

SAGE'S TRUNK DEPOT, Inc.

81 Summer Street, Boston

The Diezemann Shock Absorber

The frictional surface of a Shock Absorber must be

SELF-LUBRICATING

dirt and dust proof in order to be efficient.

THE DIEZEMANN is the only practical device of its kind on the market, embodying these necessary features.

Saves tires, engine, springs. Increases speed and power, insures comfort.

Diezemann Shock Absorber Co.

1308 Hudson Street, Hoboken, N. J.

"The RELIABLE DAYTON"

Will be on exhibition at the Chicago Automobile Show February 2-9

SPACE 148-149

SECOND FLOOR, COLISEUM ANNEX

WITH LAMPS and FULL TOOL EQUIPMENT

$550.00

RELIABLE DAYTON MOTOR CAR WORKS

4515-4517 Evans Avenue Chicago, Ill.

New Jersey Jottings

Annual Dinner of the Automobile Club of New Jersey

The passengers on the Central Railroad of New Jersey had a glimpse of glory as they sped past the windows of Stetter's Hotel at Broad street, Newark, on the evening of February 20th, when over 200 members and friends of the Automobile Club of New Jersey were at their annual dinner. The viands surpassed Delmonico's. The music was delightful. The speeches were brief and eloquent. The wit was bright as the flash of a sword blade. The stories were rich and racy. The songs were joyous and the enthusiasm was very great.

President Wood presided with dignity and grace, and every one got a royal welcome from him, whether they came from across the Atlantic or from across the street. Mr. Wood presented in concrete form the history of the club, now numbering over 800 members, and closed a fine address by introducing Commissioner Smith, who tersely explained the objects of the State Department in endeavoring to unify the laws affecting vehicular traffic, so that common safeguards and common privileges would be equally enjoyed by all using the highways.

Vice-President Angus Sinclair spoke on the subject of good roads, and paved his way with a wealth of delightful anecdotes that brought down the house. Ex-President Winthrop E. Searritt followed with an eloquent address on the history and present status of automobiling, and showed a rare mastery of the subject, especially in regard to the remarkable experiments now being conducted in various parts of the world with a view to simplifying and improving the gasolene motor. Its adoption by the airship was as inevitable as the adaptation of Watt's steam engine to water craft, and in a few years we will all be floating in space.

The delightful affair closed near midnight, and the future of the club is big with promise. It is now the second largest club of its kind in America.

To Influence Legislation

On February 14 a general meeting of the New Jersey Automobile and Motor Club was held for the purpose of putting on record the wishes of the club concerning automobile legislation during the present season. After the meeting was called President Wood adopted an excellent plan to make it lively. He called upon several of the members and urged them each to prepare a resolution calling for legislation on some particular question. The consequence was that when the meeting assembled there was a list of resolutions ready with a member prepared to speak in its support.

Among the resolutions adopted were:

Dr. James R. English moved a slight change should be made in the present automobile law requiring the State, to provide uniform number signs to be applied in front and rear of vehicles. Carried after some discussion.

Dr. Harris moved that a recommendation be put before the legislature calling for all vehicles to carry lights during the night. Carried after some recommendations were made about the proper position for such lights.

AGNES CAIN BROWN AND LILLIAN HUDSON, LEADING LADIES OF "THE ROSE OF THE ALHAMBRA" COMPANY, IN MISS BROWN'S 22 H. P. BERLIET CAR, PLOUGHING THROUGH THE SNOW ON ONE OF HER DAILY TRIPS FROM TARRYTOWN, N. Y., TO THE MAJESTIC THEATRE, NEW YORK CITY.

After considerable discussion the club indorsed a resolution calling for the appointment by the State of fifteen extra automobile inspectors.

A resolution that it be made a misdemeanor to throw, place or deposit glass or any sharp cutting substance upon the highway was carried without discussion.

Vice-President Angus Sinclair moved that all automobilists who are regularly registered in their native States should have the right, by application to the Federal government, to a certificate that will give them the right to pass through any State in the Union.

President Wood spoke very strongly in favor of this motion, but Mr. Kimber and others opposed it. It was finally determined that the club support the efforts of the A. A. A. to secure the legislature to adopt the resolution called for.

The following resolution, proposed by Dr. English, was carried:

That a legislative committee of five members be appointed annually by the president of this club for the purpose of facilitating the enforcement of the motor vehicle law, and to advocate all measures suggested for the advancement, by statutory provisions, of the interests of automobilists in general in this State, and for the better protection, improvement and building of highways in this State.

A resolution was offered in favor of automobile drivers being permitted to use chains upon their wheels when they consider them necessary, but it was lost.

The last matter of importance taken up was another resolution to the effect that autos should have the same road rights as other vehicles. Several authorities on the law spoke and it was made clear that, by a law dating back to the seventeen hundreds, all vehicles on the road were forced to comply with the same rules.

A sentiment very conspicuous in this meeting was the desire of the speakers to co-operate with the State authorities in the enforcement of the automobile law.

Will You Take A Motor Ride With Me?

A Prize of $50

FOR THE BEST ANSWER TO THIS QUESTION

WHAT IS THE BEST MOTOR FOR A TRIP LIKE THIS

?

THE publishers of AUTOMOBILE MAGAZINE offer the following prizes for the best answers to the above question—

First Prize	$50.00
Second "	25.00
Ten next prizes of	$1.00 each

Everyone is invited to enter this contest. Simply write a letter naming the car you would select and stating why it is best. Letters must not contain more than 500 words. Contest will close August 15, 1907, and prizes will be awarded in the month following. Address,

Contest Editor,
Automobile Magazine,
136 Liberty St., New York City

THIS is a genuine invitation. It is actually extended to every person in the United States who may read these lines.

During the next two years I expect to take a series of motor tours which will eventually cover every section of the United States. The trips will be partly for pleasure but mostly for business. I have organized the National Association of Magazine Agents, the members of which are found in nearly every section of our country. So the chief object of my trip will be to call upon these widely scattered members and thus strengthen our association by some personal work.

I am going to earn the car in which I will take the tours by obtaining five thousand new subscribers to the "Automobile Magazine." Of course I expect that my fellow members of the association will help considerably, but I also invite everyone who reads this to join me in the enterprise. The publishers of the magazine have made their offer to me most liberal, so that I can offer everyone who gets even a few subscriptions for me a very liberal rate of commission. In addition to the commission

I WILL GIVE A CASH PRIZE TO EVERYONE WHO OBTAINS TEN SUBSCRIPTIONS.

There isn't one person who reads this who could not obtain at least ten subscriptions EASILY. The "Automobile Magazine" is the only really popular magazine of motoring at a popular price. There are other good magazines on motoring, but they are either too technical to be popular or else too high priced. Nowadays the interest in motoring is by no means confined to the owners of automobiles. In every community there are hundreds who will be glad to find a magazine which tells all about motor cars and motoring in plain, interesting, but non-technical language.

Of course I shall be glad to hear from everyone who is at all interested in my plan. Anyone who can spare a little time to look up the motor enthusiasts of his neighborhood can make a neat sum in commissions and prizes. I will furnish everything needed to conduct the work. Simply write me—a postal will do—and I will send you some sample copies, order blanks, etc.

When I take my trips I shall so arrange my itinerary that I may make a call upon everyone who aids me in this subscription campaign. So that is why I ask you to take a motor ride with me. Will you? If so, write to-day.

HERBERT HUNGERFORD,
828 Tribune Building, New York City.

Activity in Automobile and Motor Club

The Automobile and Motor Club of New Jersey is waxing very numerous and active. There are now about 800 active and associate members upon the roll, and they are increasing steadily. The club house, which was opened about six months ago, has been a great benefit to the club, for it has become a nightly haunt of members wishing to pass a social evening. The board of trustees have inaugurated the practice of holding meeting on stated evenings, and they are now very well attended. There is always something up for discussion that tends to put new life in the club. President Wood and Secretary Bonnell have proved themselves masters in stirring up interest among the club members.

Endurance Contest in New Jersey

The Automobile and Motor Club of New Jersey have arranged to hold an endurance contest to be conducted in the spring.

Harry A. Bonnell, secretary of the local club, has been selected as chairman of the committee, and will be surrounded by some of the most enthusiastic automobilists in the city. Besides Mr. Bonnell, the committee will be composed of President Joseph H. Wood, Dr. James R. English, C. W. Baker, Will C. Shanley, W. F. ber and L. T. Wiss.

Chairman Bonnell has had wide experience in sporting matters, and is thoroughly equipped for the arduous work that he will be called on to perform. He was formerly secretary of the New York Baseball Club, and was elected secretary of the automobile club at the last annual meeting. He has been largely instrumental in bringing the organization up to its present high standard.

Many automobilists in New Jersey are hot because they are not permitted to use chains upon their wheels when the roads are slippery. Zurich, in Switzerland, is more intolerant than New Jersey. There an automobilist is not permitted to go about with tires having small metal studs for fear they may damage the streets. The automobilists there are agitating to compel the owners of horses to cover the feet of their

OLDEST FORM OF BRIDGE IN THE WORLD, A FALLEN TREE ACROSS A STREAM.

Motor Boat Show

A fine display of motor boats from the leading Eastern and Western shipyards was begun in the Madison Square Garden on February 19 and continued during the week. Every variety were exhibited from the tiny skiff to the sumptuously fitted pleasure craft. The engines have a close resemblance, as might be expected to the auto motors. There were perhaps a larger number of six-cylinder motors than is to be seen at the automobile exhibitions. A five-cylinder self-starting marine motor attracted considerable attention. The five finely balanced cranks are said to give a degree of noiseless steadiness hitherto unapproached in motor construction. The Standard Motor construction Company also attracted much attention. A 300-horsepower engine said to be the largest six-cylinder gasolene engine ever exhibited was a fine model of workmanship. Pressed steel boats were much in evidence, as also were a large number of kerosene burning engines. It was generally regretted that the fine feature of an artificial lake in the centre of the garden was wanting this year, but it could be readily seen that the mtor boat industry has made many marked improvements since last year, especially in the elegant finish of the exhibits. In this particular they are nearly keeping pace with the costly fittings and exquisite upholstery of the best automobiles.

Public opinion is waxing strong against thieves of high and low degree, but there are a great many scoundrels clothed with powers as legislators that it does not seem to reach. In almost every legislature in the country there are members introducing anti-automobile laws and anti-railroad laws for the sole purpose of being bought off. Yet these rascals are received in society as respectable men, while thousands of their superiors are requesting justice in jails and penitentiaries.

The man or woman who waits until fortune is won to be generous in small matters remains a miser to the end of life. Generosity is a plant which does not grow in a night. It needs cultivating, guiding and pruning.

The Stearns

Stearns stock cars have proved in International and other competitions absolute superiority over every other make. We use foreign materials where needed and spend as much time finishing each stock car as other makers put only on their special racing machines.

STEARNS crank shafts are cut cold from the solid billet. Heat reduces the quality of the perfect steel employed, and while few crank shafts are made of such fine material, Stearns crank shafts test 40 to 50% stronger than others of the same material formed with heat. A portion of the 2100 hours' labor that perfects the Stearns car goes into this perfected workmanship. $4500. The easy-running qualities of a "30" in highest perfection—the power of a "60" when needed. The catalogue tells how. Write to-day.

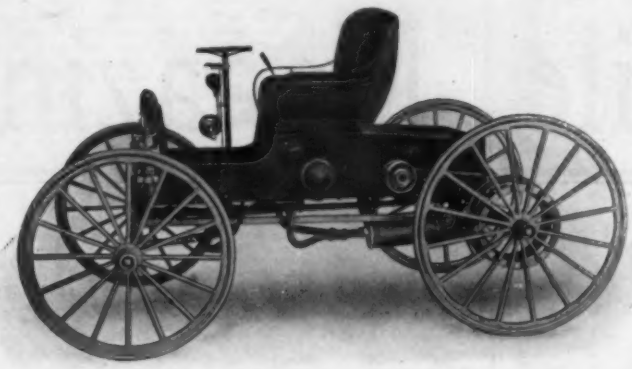
IMMEDIATE DELIVERY

F. B. STEARNS CO., A. L. A. M., Est. 1896 **3053 Euclid Ave., CLEVELAND, O.**

NEW YORK: Wyckoff, Church & Partridge.
ROCHESTER, N. Y.: U. S. Auto Co.
ST. LOUIS: Reyburn Motor Car Co.
CHICAGO: Githens Bros. Co.
WHEELING, W. VA.: R. H. Mahlke.
SAN FRANCISCO: Automobile Co.
BOSTON: A. E. Morrison Co.
PHILADELPHIA: The Motor Shop.
PITTSBURG: Ft. Pitt Automobile Co.
CINCINNATI: Hughes Automobile Co.
ATLANTA, GA.: Capital City Auto. Co.
SCOTTDALE, PA.: Scottdale Auto Co.
LOS ANGELES, CAL.: A. H. Braley.

Hatfield "Buggyabout"

The remarkable looking automobile here shown which the Hatfield Motor Vehicle Co., Cortland, N. Y., call a buggyabout, is a very striking departure from stereotyped forms. The makers say that this automobile is the result of a long series of experiments to produce a self propelled vehicle without the many undesirable qualities existing in a complicated structure and at the same time one that will be operative any day in the year, under all climatic conditions.



THE HATFIELD "BUGGYABOUT."

They are certainly on the right road when they are working toward simplicity, for unfortunately the trend of this business has lately been in the other direction.

The buggyabout is driven by an air-cooled four-cycle 12 horsepower double opposed engine, which ought to push it anywhere such a vehicle ought to go. It certainly must be very easy riding on rough roads and ought to be an ideal car for country doctors, rural doctors, letter carriers and others that do not enjoy the luxury of macadamized roads. The large wheels will prevent the jolting over every small obstacle, which is a most disagreeable characteristic of small wheeled cars.

As will be seen by our illustration of the mechanism, the car has a friction driver which is simplicity itself, and ought to drive a car of that weight without slip. A most commendable feature of the mechanism is that no gear wheel or clutch is employed. There is steering arrangement that impresses us very favorably. It consists of a semicircle of angle steel bolted to the solid front axle, a sprocket chain, tested to 2500 pounds tensile strength, resting against the angle steel and a small sprocket wheel mounted on an upright steering shaft, with a 14-inch steering wheel at the top. As the steering chain stretches it may be tightened by a turn buckle which is attached to one end of the chain.

The material used in the cars and the workmanship are of the best, which are certain to have durability and freedom from accidents. Without extras the buggyabout sells for $600.

A Carbureter that Produces Perfect Mixture

The Heath Dry Gas Company, New York, has put upon the market a carbureter which they say carburets. All carbureters are supposed to make the proper mixture of air and gasolene to create a perfect explosion, but few of them do this. Approximation is the ordinary practice which results in serious waste of fuel.

Forrest A. Heath, vice-president of the Heath Dry Gas Company, when asked to explain specifically what was claimed, replied:

"Our claim is simply that this carbureter carburets. The principle which heretofore has obtained in the construction of carbureters has provided for securing as nearly as possible correct proportions of hydro-carbon and air. There has been no means of mixing the gasolene and air evenly, neither has there been any method of breaking the gasolene up fine enough to permit of evaporation before the mixture reached the engine. The carburetting has been left for the cylinders, and the result has been imperfect combustion in varied degree—smell, smoke, heat and lack of power, especially at intermediate and low speeds.

"The 'Heath' construction calls for the carburetting of the air by mechanical means in the carbureter. In the lower part of the carbureter we determine mechanically the amount of spray and air necessary for the desired speed and power of the engine, and in the carburetting chamber we carburet that air with that spray by smashing the gasolene fine enough to destroy cohesion and cause an even evaporation."

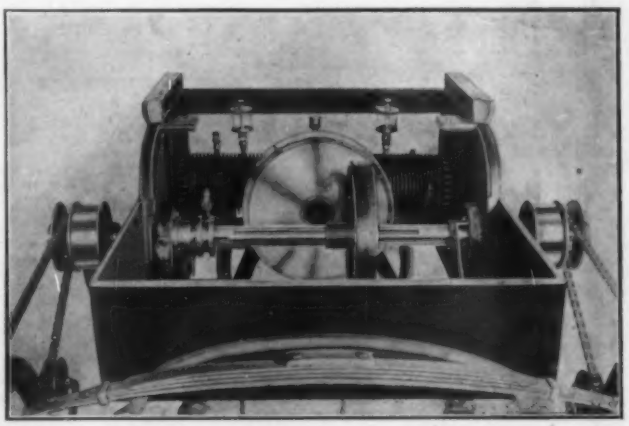
The Gabriel Horn

An evidence of the growing popularity of Gabriel horns appears in the fact that the manufacturers, the Gabriel Horn Manufacturing Co., 983 Hamilton avenue, N. E., Cleveland, Ohio, have found their old quarters entirely inadequate to the needs of the business.

They have just taken possession of another floor in the building in which their plant has been located, fully doubling the space heretofore occupied, and which a year ago was considered ample for their requirements for years to come.

In the use of the additional space every advantage has been taken of their past experience, and no detail has been overlooked which would add to the conveniences of manufacturing or to their facilities for turning work out quickly and economically.

The company states that its sales of Gabriel horns of the 1907 model have greatly exceeded their expectations and that while even their increased facilities will be taxed to the utmost, still they are in position to promise prompt deliveries of any models desired.



MOTOR OF THE "BUGGYABOUT."

The services of the Fool Killer are badly needed in Syracuse, N. Y. An idiotic story was circulated from that town to the effect that a young lady of another town who is rich enough to employ a chauffeur had wooed and wedded the latter. A joke of this kind is an outrageous slander when the young lady whose name was given is a married woman, liable to be embarrassed by the fiction.

News Stand Sales Indicate Growing Popularity of

Automobile Magazine

THE AMERICAN NEWS COMPANY

Increased their order for March to 4,350 copies

Had previously been 4,000

Read Reproduced Order

THE AMERICAN NEWS COMPANY,
29 & 41 Chambers Street.

New York, Feb. 16 1907

PERIODICAL DEPARTMENT

To Automobile Mag

Please make our order for the next issue of

Automobile Mag. 4350
Four Thousand Three Hundred Fifty

Respectfully,

THE AMERICAN NEWS COMPANY,

By H. J. L.

AUTOMOBILE MAGAZINE,

136 Liberty Street, ∴ ∴ ∴ New York

We Will Save You Money

IF YOU USE OUR

MILWAUKEE RADIATOR COMPOUND

OR OUR

MILWAUKEE COMBINATION ANTI-FREEZING COMPOUND

because the lime and impurities of your cooling water in Radiators and Water-Jackets settle and form a scale on the metal. One-eighth of an inch scale around your water jacket increases your lubricating oil bills 30 per cent., besides it cuts down the life of your Motor on account of improper cooling.

If you add our MILWAUKEE RADIATOR COMPOUND to your cooling water, your water-jackets and radiators will always be free from scale, therefore guarantee a proper cooling, save your money on lubricating oil bills and lengthen the life of your cylinders.

OUR MILWAUKEE COMBINATION ANTI-FREEZING COMPOUND does the same thing as our RADIATOR COMPOUND and is superior to any ANTI-FREEZING COMPOUND on the market to-day. Water containing this compound in proper quantities, and according to our directions, will not freeze at a temperature as low as 30 degrees below zero, and it does not injure the metal.

Prices are as follows:

MILWAUKEE RADIATOR COMPOUND, Per Gallon Can,	$1.00
MILWAUKEE COMBINATION ANTI-FREEZING COMPOUND Per Gallon Can,	1.25

A liberal discount will be allowed on cases containing one dozen gallon cans or more and also on bulk orders. These preparations are cheaper than anything on the market to-day, and as to quality they cannot be beaten.

BADGER MFG. AND SUPPLY CO.

Dept. "B" MILWAUKEE, WIS.

Makes Easy Motoring

The only oil which can be relied upon to take care of your engine under all conditions is Mobiloil. Whatever the make of your automobile or the kind of engine which propels it—there is a special grade of

VACUUM

MOBILOIL

for it. Mobiloil in its five different grades is scientifically correct—its use completely eliminates all lubrication troubles.

Send for booklet which tells the proper oil for your automobile. It's free. Mobiloil is sold by dealers everywhere in barrels and cans of varying capacities.

MANUFACTURED BY
VACUUM OIL CO., Rochester, N. Y.

The Automobile Magazine

The most instructive and entertaining periodical of its kind published

AND

KRAUZ'S COMPLETE AUTOMOBILE RECORD

A popular and handsome volume designed to furnish the autoist with a complete record of expenditures and other information that will interest every motorist. The book is album shape, 144 pages, bound in cloth, attractive cover design in colors, absolutely given free to every Subscriber for one year to the

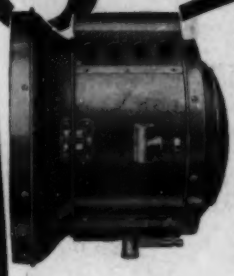
AUTOMOBILE MAGAZINE

SPECIAL OFFERS TO OUR SUBSCRIBERS:

One year Automobile Magazine and Krauz's Complete Automobile Record, in cloth	$1.00
Krauz's Complete Automobile Record, bound in red morocco	$1.50
Krauz's A B C of Motoring, bound in cloth	$1.50
Krauz's A B C of Motoring, bound in red morocco	$2.00

Address AUTOMOBILE MAGAZINE -- 136 Liberty St., New York

SOLAR LAMPS



Are Made by

EXPERT LAMP MAKERS—not ordinary mechanics or tinsmiths.

We employed every expert lamp maker to be found in the west at our Kenosha factory and still could not supply the demand.

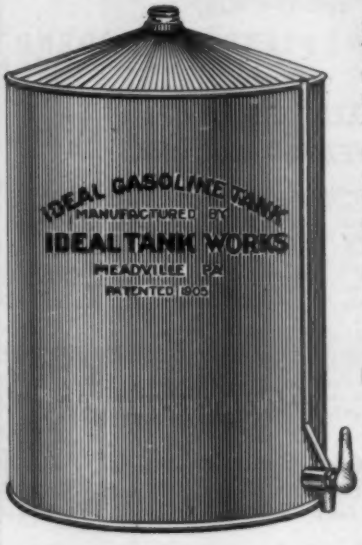
It was in order to get additional expert lamp makers that we opened our large factory in New York City. This factory extends from Thirty-Sixth street to Thirty-Seventh street and is two hundred feet deep. Though the expense of operating a factory in New York City is very great we had to open it there because lamp makers of the high quality we wished to employ would not leave New York City.

Solar Lamps and Generators are made from fewer pieces than any other make on the market. Our large twenty ton presses draw the heavy brass into the proper forms and these pieces are riveted or screwed together.

Every feature of the Solar Lamp and Generator is the very best as proven by our twelve years of doing but one thing—the manufacture of Acetylene Lamps and Generators for Bicycles, Automobiles and Motor Boats.

BADGER BRASS Mfg. Co.
KENOSHA, WIS.
Eastern Branch 11th Ave., 36th & 37th Sts., New York City.

The Ideal Automatically Self-Ventilating Gasoline Tank



The only perfect Gasoline Tank manufactured. It is air tight all the time, ventilation is secured at the same operation that opens the faucet, when faucet is closed tank is absolutely air tight.

If You Handle Gasoline You Need this Tank.

We make any size tank you want, the 1 bbl. size holds 65 gallons, price, $6.50. Will give prices of any size. We also supply this patent faucet made to screw into a wooden barrel. Send for circulars.

Agencies wanted in every city.

IDEAL TANK WORKS
Box 354 MEADVILLE, PA.

CONSULT OUR

Buyers' Finding List

IF YOU ARE IN NEED OF

Supplies or Repairs

FOR YOUR AUTOMOBILE

Mention The Automobile Magazine when purchasing

Breeziest Book Published

LETTERS OF THE MOTOR GIRL

By ETHELLYN GARDNER

THIS book is a hummer---If you want something new in a book, here it is, served up in a pleasing manner---by the way, do you know Smith of Buffalo? He cuts quite a dash in this little book. Ask your dealer for a copy of Letters of The Motor Girl---if he hasn't got it, $1.00 sent to the author, with your name and address, will speedily bring it to you, post-paid.

ETHELLYN GARDNER
Lock Box 1664 BOSTON, MASS.

Book Department

Cash must accompany order. No books sent C. O. D. Give name of book and author, and we can furnish any book published. All books sent by mail free for price named. If not satisfactory return and we will refund the money.

AUTOMOBILE MAGAZINE

136 Liberty Street, New York

A B C of ELECTRICITY. Wm. H. Meadowcroft. The best known elementary treatise on this interesting subject. Written in language that is easily understood. Fully illustrated.....50c.

AUTOMOBILE POCKETBOOK. E. W. Roberts. There are many books that give information and instruction concerning automobiles, but the pocketbook prepared by Mr. Roberts is the gem of purest ray serene. It ought to be the bosom friend of every automobilist. It not only describes in clear language the construction of automobiles and their accessories, but tells how many difficulties to be met with in operating can be overcome $1.50

CATECHISM OF ELECTRICITY. N. Hawkins. This contains enough questions and answers to give any mechanic a pretty general knowledge of electricity as applied to modern uses. Its 550 pages and 300 illustrations are full of information for the mechanic.....$2.00

ELECTRICITY SIMPLIFIED. T. O'Conner Sloane. This makes plain many of the perplexing prorblems of electricity by simplifying them and clearing away some of the fog which some like to throw around a new subject. By clearing this away the problems become easy of solution.....$1.00

ELECTRICIAN'S HANDY BOOK. T. O'Conner Sloane. A comprehensive work on practical electric engineering that can be readily understood by the non-technical man and at the same time the educated engineer will receive great benefit from it. Pocketboook style. Leather bound $3.50

ELECTRIC WIRING. By Cecil P. Poole. Containing numerous elementary tables and formula. Illustrated with diagrams. Leather.....$1.00

GAS ENGINE CONSTRUCTION. Henry V. A. Parsell and Arthur J. Weed. Clearly and simply describes the principles of operation of gas engines. Illustrated $2.50

GAS ENGINE TROUBLES AND REMEDIES. By Albert Stritmatter. Deals with gasoline feed supply. Starting fuel consumption, ignition timing. Illustrates troubles, lubrication, and explains the condition of the engine as indicated by its noises. It is not a guide in engine designs; it enables the gas engine operator to help himself and to learn the "why" of things.....$1.00

GAS ENGINES AND PRODUCER-GAS PLANTS. R. E. Mathot. A guide for the gas engine designer, user and engineer in the construction, selection, purchase and operating of gas engines. Illustrated $2.50

GAS, GASOLINE AND OIL VAPOR ENGINES. Gardner D. Hiscox. The latest book on this interesting and important subject. Has chapters on the horseless carriage as well as on the leading makes of engines.....$2.50

HORSELESS VEHICLES, AUTOMOBILES AND MOTOR CYCLES. Gardner D. Hiscox. Treats on the construction and management of all kinds of automobiles. Illustrated.....$3.00

HOW TO BECOME A SUCCESSFUL ELECTRICIAN. T. O'Conner Sloane. A plainly written book for those who aspire to the electrical field. The author is a practical man and gives much good advice $1.00

SELF-PROPELLED VEHICLES. Homans. A most comprehensive book on the theory, construction, operation, care and management of all forms of motor cars. Has upwards of 600 pages 6½ by 8½ inches, most profusely illustrated by first-class engravings. Describes the construction and operation of cars driven by steam, gasoline or electricity. Best book of its kind in print.....$2.00

SPANGENBERG'S STEAM AND ELECTRICAL ENGINEERING. By Messrs. E. Spangenberg, A. Uhl and E. W. Pratt, 1904. A reference work for engineers, electricians, firemen, linemen, wiremen, steamfitters. Treats of stationary and locomotive engineering, electricity, compressed air, mechanical refrigeration, gas and gasoline engines, hydraulic elevators, repair work, etc. 672 pages, partly in question and answer form $3.50

THE GAS AND OIL ENGINE. Dougald Clark. Treats of thermodynamics, combustion and explosion, different types of engines in practice, mechanical details and production of gas. Scientific but not mathematical, except in the chapters on thermodynamics. 558 5¼ x 8-inch pages; 228 illustrations...$4.00

THE GAS ENGINE HANDBOOK. By E. W. Roberts. A small pocketbook of 220 pages giving just the information about theory, running and design that a practical man wants. Gives details of gas engines' troubles, their cause and cure. Illustrated. Flexible leather..$1.50

THE PRACTICAL GAS ENGINEER. By E. W. Loganecker. A manual of practical gas and engine knowledge. Covers errors to be avoided in construction. Tells how to erect, operate and care for gas and gasoline engines. Intended for the gas and gasoline engine owner, engineer or person wanting practical information on this style of motor. Good index to find subjects. Third edition 1903 .....$1.00

CRAWFORD INN.

FOR all the luxuries and accommodations of a high-class hotel, with an unexcelled cuisine and polite service, dinner at all hours of the day for Automobile Parties and Tourists, go to

CRAWFORD INN, Pompton Lakes, New Jersey.

On direct route to TUXEDO, SUFFERNS and GREENWOOD LAKES

"House Open All Year 'Round."

HAYNES

Reliability

The makers of the Haynes have been developing their car for *13 years.*

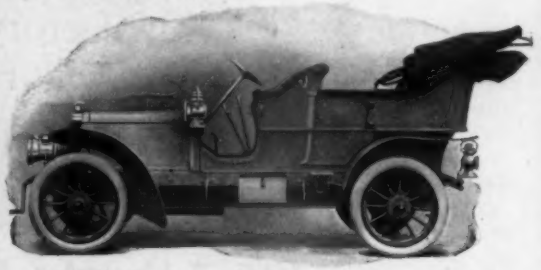
They know their car through and through.

Year after year they have seen their old cars come back after varied use and have spotted here and there chances for improvements.

Their experience has developed for 1907 a car that can be safely advertised for *reliability*—a car that can be *trusted.*

It contains no parts *not made in the Haynes Factory,* no principles that are unfamiliar to the Haynes designers.

In these days when every blacksmith is buying parts and assembling cars under a private trade-mark, the fact that the Haynes factories really make *everything* in their car is a guarantee of Haynes *reliability.*



The Hayes Standard 50 H. P. Touring Car for 1907, Model "T," the highest powered shaft driven car built. Price $3,500.

HAYNES AUTOMOBILE CO., Kokomo, Ind.

Oldest Automobile Manufacturers in America *Members A.L.A.M.*

New York, 1715 Broadway Chicago, 1420 Michigan Avenue

HOTEL EUCLID

Euclid Avenue

Cleveland's Newest Hotel

EUROPEAN

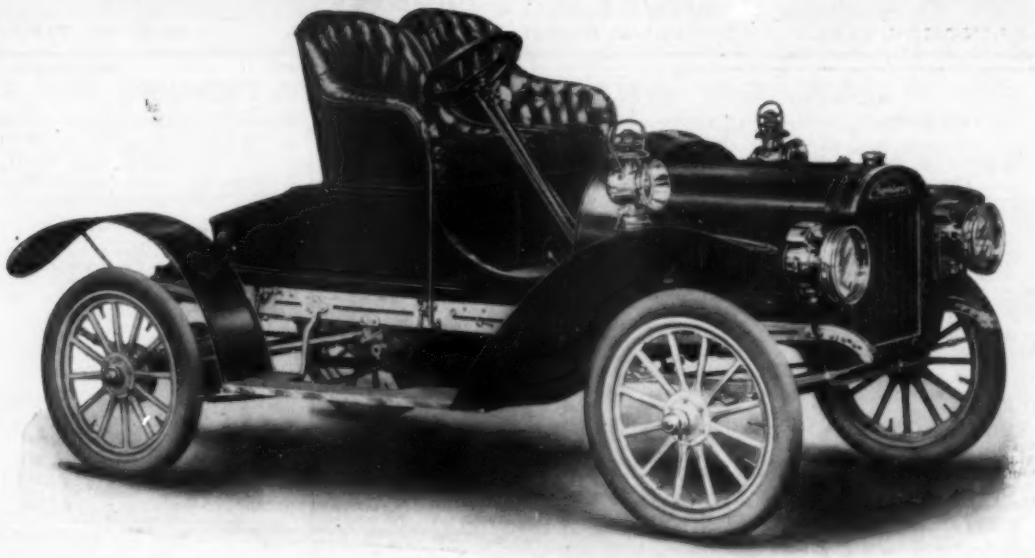
Rates $1.00 and Up.

300 Rooms.

Hot and Cold Water in All Rooms.

FRED S. AVERY, *President*

Rambler



Model 27, Price $950.

Equipped with acetylene head lamps with separate generator, oil tail lamp, and 6-volt 60-ampere storage battery, $1,000.

The ideal qualities of a touring runabout are reached in the Rambler Model 27.

In this is embodied the new Rambler unit power plant composing a double opposed horizontal motor, planetary transmission and multiple disc clutch entirely enclosed with three-point support.

No moving part of the motor or transmission gear is exposed, and every part is entirely accessible from above.

You will not appreciate the many valuable features of this model without our new catalogue containing complete description of this and other 1907 models. Mailed upon request.

Main Office and Factory, Kenosha, Wisconsin, U. S. A.

Branches:

CHICAGO MILWAUKEE BOSTON PHILADELPHIA SAN FRANCISCO

NEW YORK AGENCY, 38-40½ W. 62nd ST. REPRESENTATIVES IN ALL LEADING CITIES

Thomas B. Jeffery & Company

OUR TIRE ADJUSTERS WILL PUT ON OR TAKE OFF ANY TIRE

The "MINUTE" ADJUSTER

For CLINCHER TIRES

In from One to Five Minutes

WITHOUT EXERTION

The "Minute" clincher tire adjuster is true to its name. It will actually take off or put on the *heaviest clincher tire in one minute* without injury to the shoe or inner tube and may be easily operated by a woman or child.

The "L. & M." Ring tire adjuster is the only ring tire adjuster on the market.

It consists of six tools which are slipped over the tire at intervals, and by turning crank, the tire is forced back from the ring all the way around, thus enabling you to put on or take off the ring with ease.

Both adjusters are absolutely guaranteed.

Write to-day stating kind of tire you use, and we will send you illustrated booklet and price list. Patents applied for.

LONG & MANN COMPANY

520 Central Building, Rochester, N. Y.

The "L. & M." ADJUSTER

For RING TIRES

GARAGE AND REPAIR STATIONS

ALABAMA.

Birmingham, White-Blakeslee Mfg. Co.
Mobile, Mobile Motor Car Co.

ARIZONA.

Phoenix, Southwestern Automobile Company.

CALIFORNIA.

Long Beach, C. E. Walters, 323 E. 4th St.
Los Angeles Auto Machine & Garage Co., 631 San Pedro St.
Los Angeles, Burke Bros., 485 S. Spring St.
Moore, Geo. P. Co., Inc.
Oakland, Bennet's Auto Garage.
Riverside. Alex. Nelson, Eighth St.
Sacramento, Jos. J. Schneer, 1009 No. J St.
San Francisco, Boesch Lamp Co., 1569 Grove St.
San Pedro, Marine Supply Co.
Upland, Euclid Garage.

COLORADO.

Colorado Springs, Colorado Springs Garage Co.
Denver, Automobile & Repair Co., 1640 B'way.
Denver, O. Burke, 918 Larimer St.
Pueblo, Pueblo Automobile Co.

CONNECTICUT.

Bantam, Bantam Anti-Friction Co. (First-Class Repair Station.)
Bridgeport, Bridgeport Automobile Co.
Greenwich, Allen Asten & Co.
Hartford, Brown, Thompson & Co., Main St.
Hartford, The Miner Garage Co., Cor. High and Allyn Streets.
Jewett City, Jewett City Auto Sta.
Meriden, Meriden Automobile Station. Selling, Storing and Sundries, Automobile Repairing, 41 West Main Street. Telephone, 359.
New Britain, Corbin Motor Vehicle Co., Myrtle Ave. and High St.
New Haven, D. H. Buell & Co., 516 State St.
New London, W. H. Starr, 88 Greene St.
Norwich, Smith & Swan, 276 Main St.
Waterbury, H. M. Tyrrell, Jefferson St.

DELAWARE.

Wilmington, T. C. Bradford, 311 Market St.
Wilmington, Delaware Auto. Storage and Repair Co.

DISTRICT OF COLUMBIA.

Washington National Capitol Auto Co., 1130 18th St., N. W.
Washington, J. B. Maxwell, 829 14th St., N. W.

FLORIDA.

Jacksonville, Clarke Automobile and Launch Co., 18 Ocean St.
Miami, Mr. Einig.

GEORGIA.

Atlanta, Capitol City Automobile Company.
Atlanta, Augusta Garage Co., 51 Broad St.
Bainbridge, Charles A. Caldwell.
Macon, Automobile & Machinery Co.
Savannah, G. W. Thomas, 114 Jefferson St.

ILLINOIS.

Aurora, W. J. Reir.
Chicago, The American Locomotive Co., 1532 Michigan Ave.
Chicago, The Automobile Parts & Equipment Co., Michigan Ave. and 13th St.
Chicago, The Franco-American Auto & Supply Co., 1404 Michigan Ave., C. C. Boynton, Mgr.
Chicago, Owen H. Fay Livery Co., 243 Michigan Ave.
Chicago, White & Wildman, 1551 Michigan Ave.
Chicago, A. C. Banker Auto Co., 35th St. and Grand Blvd.
Chicago, The Haynes Automobile Co., 241 Wabash Ave.
Chicago, The Excelsior Automobile Supply Co. and Continental Caoutchouc Co., 1436 and 1438 Michigan Ave.
Chicago, Stoddard-Dayton Automobile Co., Grand Boulevard and 40th St.
Joliet, The Joliet Automobile Co.
Monmouth, Wm. Bartlett.
Elgin, Frank B. Wood, River St.

INDIANA.

Flatrock, Flatrock Automobile Co.
Indianapolis, Auto Storage & Repair Co., 23 E. Ohio St.
Indianapolis, Central Garage, 330 E. Market St.
Lafayette, The Tippecanoe Automobile Co., 928 Main St.
Muncie, Muncie Auto Garage & Repair Co., 209 E. Adams St.

IOWA.

Burlington, Ralph Rogers & Co., 316 N. Main St.
Coin, E. L. Benedict & Sons.
Cedar Rapids, Cedar Rapids Supply Co., 307 3d Ave.
Des Moines, Mason Automobile Co., E. 5th and Market Sts.
Manchester, Manchester Auto. Co.
Muscatine, Fred. Bowman.
Ottawa, J. Kerfoot.
Sioux City, The William Warnock Co.
Waterloo, Wm. Galloway.

KANSAS.

Larned, W. N. Woelk, Jr.
Topeka, Kenwood Garage, 111 E. 7th St.

KENTUCKY.

Louisville, R. L. Davis, 1003 W. Chestnut St.
Louisville, Longest Bros.

LOUISIANA.

New Orleans, Independent Auto. Co., Ltd.

MAINE.

Augusta, Fifield Brothers.
Lewiston, H. J. Willard Co., 48 Ash St.
Portland, Dowling's Garage, 22 Forest Ave. Telephones N. E. 1630, Auto. 1656.
Portland, Maine Motor Carriage Co., Free & South Sts. Telephones N. E. 290, Auto. 2861.
Rockland, The Rockland Garage and Auto Co., Main and Winter Sts.
Waterville, The Waterville Motor Co., 245-247 Main St.

MARYLAND.

Baltimore, Auto Storage & Repair Co., 1118 Cathedral St.
Baltimore, Balto. Motor Car Co., 327 N. Calvert St.
Baltimore, A. S. Brown, Mt. Royal Ave.
Baltimore, Chas. I. Wiegand, 840 No. Fulton Av.
Cumberland, The W. W. Garage & Machine Co., No. Center St.

MASSACHUSETTS.

Boston, Adams-Dutton Motor Car Co.
Boston, The Boston Mechanical Co., Motor Mart.
Boston, Boston Tire and Rubber Co., 184 Friend St.
Boston, F. L. Bradley, 624 Columbus Ave., Dorchester.
Boston, E. S. Breed, Buffum.
Boston, Park Square Auto Station, 43 Columbus Ave.
Brockton, Geo. J. Donahue, 389 Warren Ave., Telephone 92. Charging and accessories.
Fall River, John Williams, 464 Pleasant St.
Gloucester, W. Hodgkins, 9 Western Ave.
Lynn, Y. C. Der Bar, Broad St.
Newton Centre, J. W. Crowell, Commonwealth Ave. Tel. 444 Newton West.
Northfield, N. W. Keet.
Pittsfield, Berkshire Automobile Co.
Pittsfield, Central Automobile Station Co., Renne Ave. & Pearl St. Telephone 161-11.
Stockbridge, H. B. Parsons.
Taunton, Brownell & Burt.
Waltham, Watch City Auto Co., Music Hall Ave.
Worcester, Worcester Auto Co., 30 Exchange St.

MICHIGAN.

Bay City, Mobile Motor and Machine Co.
Coldwater, V. L. Pendleton & Co.
Detroit, Berg & Brehmer, 238 Jefferson Ave.
Detroit, Detroit Automobile Top Co., 265 Jefferson Ave.
Detroit, The Free Bock Auto Co.
Detroit, Wayne Auto & Supply Co.
Flint, Samuel Wey, No. Saginaw St.
Grand Rapids, Lubeck Automobile Co.
Lansing, John Bohnet, 117 Lenawee St., E.
Saginaw, Morris Auto Co., Tilden St. and Genesee Ave.

MINNESOTA.

Minneapolis, Adland Storage & Auto Co., 240 7th Ave. South.
Minneapolis, C. D. Velie, 225 Clinton St.
St. Paul, Bird Burney Auto Co., Washington and 5th Sts.
Winona, Adams Automobile Co.

MISSISSIPPI.

New Orleans, Crescent City Automobile Co., South Rampart St.

MISSOURI.

Kansas City, E. P. Moriarity & Co., 1000 Grand Ave.
Kansas City, Day Auto Co., 1407 S. 12th St.
St. Louis, Olive Auto Co., 3970 Olive St.
St. Louis, The Union Garage, 4603 Olive St.
St. Louis, Colonial Automobile Co., 3944-3950 Olive St.

NEBRASKA.

Lincoln, The Wittman Co., 205 S. 11th St.

NEW HAMPSHIRE.

Manchester, Brodie Elec. Co., 42 Pleasant St.

NEW JERSEY.

Asbury Park, C. R. Zacharias.
Atlantic City, Atlantic Automobile Co.
Atlantic City, Columbia Automobile Station.
Bloomfield, Albert Loppacker, Glenwood Ave. and Henry St.
Camden, Reeves Auto Station, 7th and Market Sts.
East Orange, Hollywood Motor Car Co., Opposite Grove St. Sta.
Elizabeth, Elizabeth Auto Co., 14 Westfield Ave.
Englewood, J. W. Van Wart, Palisade Ave.
Freehold, Hotel American.
Hackensack, Hackensack Auto Co.
Jersey City, Crescent Cycle & Automobile Co., 2565 Hudson Blv'd.
Jersey City, S. W. J. Kells Mfg. Co., 130 Highland Ave.
Long Branch, W. H. Parker & Co., 148 B'way.
Montclair, Montclair Auto Station Co., Valley Road.
Newark, Newark Garage & Repair Co., Clinton Ave. and Somerset St.
Newark, F. E. Boland Motor Co., 239 Halsey St.
Newark, Coburn & Beldon, 577 Central Ave.
Newark, Astor Garage, 56 Sherman Ave.
Newark, Riverside Garage, 129 Riverside Ave.
Newark, Motor Vehicle Co., 518 Broad St.
Newark, New Jersey Auto Car Co., 226 Halsey St.
Newark, Austin Auto Co., 484 Broad St.
Newark, Forest Hill Auto Co.
Orange, Orange Automobile Garage.
Passaic, Passaic Motor Car Co., 147-151 Main Av.
Paterson, Brown & Schmidt, 199 Paterson St.

No Larger Around Than a Watch

The Speed Dial is Perfectly Steady and Readable At All Times

The Warner AUTO-METER

is used on the best cars, *Because*

It is the neatest and most handsome in appearance.

It is the *Only* speed indicator which is accurate at *Low Speeds*.

It is the most reliable, not only on account of the large figures (black on white), but because the dial is perfectly steady at all speeds and under all conditions of road.

It is the most durable speed indicator remaining accurate and dependable for years.

It has sapphire bearings like a chronometer—no cams or other sliding parts to wear or get out of order.

It cannot be broken or rendered inaccurate by any shock which would not destroy the car itself.

The reason why the Auto-Meter is really the only accurate, dependable and truly reliable speed indicator is ***worth knowing***. It's worth any man's time to find out. Will you write us and let us *prove up*! *You can't afford to buy wrong.*

Warner Instrument Co., 526 Roosevelt Street, Beloit, Wis.

Advise us the **Model** or **Power** of your Car when you ask for price installed ready for use

GARAGE AND REPAIR STATIONS—*Continued*

Rahway, F. E. Boland & Bros., 28 Westfield Ave.
Summit, Chester & Henry.
Trenton, Walter Richards.

NEW YORK.

Albany, Albancy Exchange, Storage and Repairing, State and Larke Sts.
Albany, Ernest A. Norris, 325 Central Ave.
Amsterdam, J. L. Peck.
Ballston Springs, Tracy, Nicholl Auto Garage.
Bath, Frank Klickler.
Buffalo, Auto-Car Garage, 77 Edward St., Near Delaware Ave.
Buffalo, Kelsey Co., 42 Niagara St.
Buffalo, Motor Vehicle Garage Co., 1133-1137 Main St.
Buffalo, C. R. Baine, 1525 Seneca St.
Elmira, H. C. Goarser, 122 R. R. Ave.
Ithaca, Fairbanks, Grant Mfg. Co., 109 Albany St.
Middletown, C. L. Swezy, 28 James St.
New Rochelle, Deselbrow Motor Car Co.
New York City, American Automobile Storage Co., 36-38-40 W. 60th St.
New York City, Cryder & Co., Storage and Repairs, 63d St. & Park Ave.
New York City, American Locomotive Auto Co., B'way and 57th St.
New York City, Archer & Co., 231-233-235 W. 40th St.
New York City, The Autocar, 2181 B'way.
New York City, The Auto Mart, 501 7th Ave.
New York City, Bouton Motor Co., 110 W. 42st St.
New York City, Sidney B. Bowman Auto Co., 52 W. 43d St.
New York City, B'way Automobile Exchange, 515 7th Ave.
New York City, Columbus Auto Exchange & Stor. Co., 313 W. 52d St.
New York City, Hol Tan Co., Bway & 56th St.
New York City, Harry S. Houpt, 731 7th Ave.
New York City, Locomobile Co. of America, B'way and 76th St.
New York City, Majestic Automobile Co., 1709 B'way.
New York City, Mt. Morris Auto Garage, 27 W. 124th St.
New York City, Panhard & Levasso Auto Co., B'way and 62nd St.
New York City, Tuxedo Garage Co., 33-39 E. 58th St.
New York City, Victor Auto Storage Co., 147 W. 55th St.
New York City, White Sewing Machine Co., 42 W. 62nd St.
New York City, Winton Motor Carriage Co., 1706 B'way.
Poughkeepsie, John Van Benschoten, Catherine St.
Rochester, Fred A. Mabbett, 189 Main St., West.
Saratoga Springs, Hodges Auto Garage.
Saratoga Springs, Ketchem's Auto Garage.
Syracuse, The Amos Pierce Auto Co., 109-113 So. State So.
Utica, Utica Motor Car Co., Harry P. Mundy.

NORTH CAROLINA.

Charlotte, L. Barringer, 10 N. Church St.

OHIO.

Akron, Union Automobile Garage Co., South College St.
Akron, Akron Auto Garage Co., 9 W. Buchtel Ave.
Cleveland, Geo. A. Crane & Co., 40 Clara St.
Cleveland, H. S. Moore, 160 Crawford Rd.
Cincinnati, Gunther Bros. Co., 1633 Madison Blv'd.
Cincinnati, Queen City Auto Co., 810 Race St.
Columbus, Capitol City Auto Co., 691 High St.
Dayton, Chas. E. Drury, Miami Motor Co.
Dayton, Kiser & Co., 29 E. 2nd St.
Toledo, Toledo Motor Carriage Co., 1012 Madison St.
Youngstown, A. E. Brown, 134 E. Federal St.

OREGON.

Portland, Ballou & Wright, 86 Sixth St.

PENNSYLVANIA.

Allentown, Harry A. Smith, Church & Court Sts.
Allentown, O. J. Dietrich, N. 10th St.
Allegheny, Allegheny Auto Co., 711 Jackson St.
Ambler, D. E. Johnson.
Dalton, Kellogg, Mosier & Co.
Doylestown, John J. Donnelly.
Easton, E. F. Crane, Holland Garage, 200 South 3rd St.
E. Downington, Griffith & Wollerton.
Erie, Bay State Machine Co., 123 Peach St.
Harrisburg, Central Penn. Auto Co., Market St.
Lancaster, Safety Buggy Co., Elizabeth and Plum Aves.
McKeesport, Sam'l Leek, 9th Ave. and Mulberry.
Overbrook, Henry Mackeller.
Philadelphia, Regent Garage, 220 South 40th St., West Philadelphia.
Philadelphia, Eastern Automobile Co., Broad below Callowhill.
Philadelphia, Bellevue Stratford Garage.
Philadelphia, 51st St. Auto Station, 51st St. and Beaumont Ave.
Philadelphia, D. L. Mulford, 1801 N. 21st St.
Pittsburg, A. Engle, 1103 Carson St., S. Side.
Pittsburg, East Liberty Auto Co., 5969 Centre Ave.
Pittsburg, H. S. Townsley, 323 Homeward Ave.
Pittsburg, Hiland Garage, Beatty and Baum Sts.
Pittsburg, Standard Automobile Co., 5917 Baum St.
Pottstown, D. G. Good.
Reading, E. S. Youse.
Stroudsburg, G. H. Schroeder.
Wilkes-Barre, Wilkes-Barre Auto Co., 23 N. Franklin St.
Wilkes-Barre, Auto Machine & Repair Co., 35 N. Washington St.
Williamsport, Williamsport Automobile Exchange, West Third St.
York, J. A. Walker.

RHODE ISLAND.

Narragansett Pier, Church & Caswell.
Newport, N. Y. Auto Repository, Ocean House Stables.
Newport, J. D. Dickson, 113 Bellevue Ave.
Providence, Philip Shaw, Reservoir Ave.

TENNESSEE.

Chattanooga, Sid Black Automobile Co.
Nashville, Anderson Auto Co., 314 4th Ave. N.
Nashville, B. T. Bell, 166 3d Ave. N.

UTAH.

Ogden, Ogden Automobile Co., Twenty-fourth St.

VERMONT.

Rutland, Clark & Mathews, 161 West St.
White River Junction, Excelsior Carriage Co.

WISCONSIN.

Milwaukee, C. G. Norton & Co., 459 B'way.
Milwaukee, Hein & Casper, 501 B'way.
Milwaukee, Welch-Estberg Co., Seventh and Grand Ave.

DOMINION OF CANADA.

Montreal, Dominion Motor Car Co.
Quebec, Quebec Auto and Launch Co.
Winnipeg, McCulloch & Bosewell, 189 Lombard St.
Winnipeg, Jos. Maw & Co., 280 William St.

CARTERCAR "THE CAR AHEAD"

The Carter patented system of friction transmission used in these cars is guaranteed the simplest, most durable and powerful in use. One lever controls all speeds forward and back. Three years in actual use.

No gears to strip, no clutch to slip, will hold on any hill. Catalogue free.

MOTORCAR CO. DETROIT, MICH.

THEY SUPPLY YOUR WANTS

AMMETERS.

American Coil Co., Foxboro, Mass.
American Electrical Novelty Mfg. Co., Spring, Hudson and Vandam Sts., New York City. (Ever Ready.)
Atwater Kent Mfg Works, 42-46 N. 6th St., Philadelphia, Pa.
Dow Portable Elec Co., Braintree, Mass.
Eldridge Electric Mfg. Co., 3 Post Office Sq., Springfield, Mass.
Snutsel Auto-supply Co., 1534 B'way, N. Y.

ANTI-SKID DEVICES.

Brown, J. C., Mfg. Co., Butler, Ind.
Crone, F. G., 152 Northampton Ave., Buffalo, N. Y.
Dentzeau, Geo., 161 Grand St., N. Y. City, N. Y.
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Mesinger, H. & F., Mfg. Co., 1801 First Ave., N. Y. City, N. Y.
Snutsel Auto-Supply Co., 1534 B'way, N. Y.
Sunbury Mfg. Co., Sunbury, Ohio.
Weed Chain Tire Grip Co., 28 Moore St., N. Y. City, N. Y.

AUTOMOBILE COVERS.

Armbruster, R. H., 309 S. 6th St., Springfield, Ill.
Crescent Auto Top Co., 38 W. 43d St., N. Y. City.
Duane, W. J. & Co., 1771 Broadway, New York City.
Empire Gear and Top Co., 413 N. 22d St., Philadelphia, Pa.
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Fickling & Co., 154 E. 57th St., N. Y. City.
Gilbert Mfg. Co., New Haven, Conn.
National India Rubber Co., Bristol, R. I.
Snutsel Auto-Supply Co., 1534 B'way, N. Y.
Springfield Auto Top and Upholstering Co., 102-106 Dwight Street, Springfield, Mass.
Vehicle Apron and Hood Co., 198 E. Rich St., Columbus, Ohio.
Wiley (The), Wm. H. Co., Box 78, Hartford, Conn.

BASKETS.

Burlington Basket Mfg. Co., Burlington, Iowa. (Refrigerator.)
Hall, E. L., 239 E. 27th St., New York City. ("M. & A.")
Heywood Bros. & Wakefield Co., 1 4 Portland St., Boston, Mass.
Snutsel Auto-Supply Co., 1534 Broadway, N. Y.

BELLS (AUTOMOBILE).

Liberty Bell Co., Bristol, Conn. "Liberty" and "Autobell."
Mossberg, Frank, Co., Attleboro, Mass.
Post & Lester Co. (The), 20 Sargeant St., Hartford, Conn.
Rosseau Mfg. Co., 310 Mott Ave., N. Y. City. (Electric.)

BRAZING COMPOUNDS.

A. & J. Mfg. Co., 26 W. Randolph St., Chicago, Ill. (For cast iron and steel.)
American Ferrofix Brazing Co. (The), 813-a Arcade Bldg., Philadelphia, Pa.
Dixon, Jos., Crucible Co., Jersey City, N. J. (Brazing graphite.)
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
National Cement and Rubber Mfg. Co., 3053-59 Monroe St., Toledo, Ohio. "High Pressure" and "Red Cross."
Standard Brazing Co., 88 Broadway St., Boston, Mass.
Thompson, Chas. A. Co., 39 Cortlandt St., N. Y. City. (Self-fluxing solder.) "Solderine."
U. S. Brazing Compound Co., 113-115 S. 2d St., New Bedford, Mass.

BUFFETS, PORTABLE.

Portable Buffet Co., 145 E. 42d St., N. Y. City.

CAPS (AUTO).

Automobile Equipment Co., 251 Jefferson Ave., Detroit, Mich.
Kibbe & Tomlinson, Batavia, N. Y.
Morawetz Co. (The), 343 Broadway, Milwaukee, Wis.
Pontiac Knitting Co., Pontiac, Mich.
Post & Lester Co. (The), Hartford, Conn.
Saks & Co., Broadway, 33d and 34th Sts., N. Y. City.
Scandinavian Fur and Leather Co., 14-16 W. 33d St., New York City.
Shaw, Ora D., 109 Kingston St., Boston, Mass.
Springfield Hat and Cap Co., Springfield, Mass.

CARBIDE.

Acetylene Gas Illuminating Co., 105 Walker St., New York City. (Crude and refined.)
Snutsel Auto-Supply Co., 1534 Broadway, N. Y.

CARBURETERS.

American Coil Co., Foxboro, Mass. (Mixing Valve.)
American Generator Co., N. E. Cor. Park Ave. and 63d St. (Combined tank and carbureters.)
Ardsley Motor Car Co., Yonkers, N. Y.
Automobile Supply Co. (The), 1339 Michigan Ave., Chicago, Ill.
Auto. & Power Appliance Co. (The), 357-359 The Arcade, Cleveland, Ohio.
Barker, C. L., Norwalk, Conn. "Barker."
Bowen Motor Co., 92 Baynes St., Buffalo, N. Y. "Phoenix."
Bradford Motor Co., Bradford, Pa. "Longuemare."
Breeze Motor Mfg. Co., 33 Court St., Newark, N. J.
Brennan Motor Co., 101 Grape St., Syracuse, N. Y.
Burtt Mfg. Co., 124-130 N. Edwards St., Kalamazoo, Mich.
Byrne, Kingston & Co., Kokomo, Ind. "Kingston."
Camden Anchor-Rockland Machine Co., Rockland, Me. "Knox."
Clemick-Hirsch Co., 594 National Ave., Milwaukee, Wis.
Columbus Screw & Mach. Co. (The), 244 Kaiser St., Columbus, Ohio.
Cook Kerosene Carbureter Co., 15-21 Exchange Place, Jersey City, N. J. "Cook Kerosene."
Crouch Motor Co., Stoneham, Mass. "Crouch."
Culver Novelty Co. (The), Culver, Ind.
Curtiss, Geo. H., Mfg. Co., Hammondsport, N. Y.
Dearborn, F. W., 751 Old South Bldg., Boston, Mass.
Dow Portable Electric Co., Braintree, Mass. "Methot."
Dry Gas, The Heath Co., 1623 Broadway, New York City.
Duryea Power Co., N. River and Hockley Sts., Reading, Pa. (Atomizer.)
Essex, G. B., Brass Co., 180 Franklin St., Detroit, Mich.
Fairmount Engineering Co., 3207 Spring Garden St., Philadelphia, Pa.
Funke, A. H., 83 Chambers St., N. Y. City, N. Y. (Motor Cycle.)
Generator Valve Co., 108 Liberty St., N. Y. City, N. Y. (Marine.)
Hatcher Auto-Parts Co. (The), 138 Viaduct, Cleveland, Ohio.
Hewitt Motor Co., 6-10 E. 31st St., N. Y. City, N. Y.
Holley Bros. Co., 661-673 Beaubien St., Detroit, Mich. "Holley."
Hurd & Haggin, 316 Hudson St., N. Y. City, N. Y.
Jager, Chas. J., Co., 166-68 High St., Boston, Mass.
Little & Eastman Co., 595 Harrison, Ave., Boston, Mass. "Menn's."
Massnick Mfg. Co., 671 Atwater St., Detroit, Mich.
Maxwell & Fitch Co. (The), Rome, N. Y.
Mayo Damper Co., 395 Walnut St., Pottstown, Pa.
Menn's New Auto Mart, Boston, Mass.
Merkel Motor Co., Layton Park, Milwaukee, Wis.
Michigan Motor Co., 246 S. Front St., Grand Rapids, Mich.
Murray, John A., 112 Front St., Brooklyn, N. Y.
North Chicago Machine Co., North Chicago, Ill.
Sherwood Mfg. Co., 1702-12 Elmwood Ave., Buffalo, N. Y.
Shipman Mfg. Co., Sunbury, Pa. "Shipman."
Speed Changing Pulley Co., 750 E. Washington St., Indianapolis, Ind.
Walker, B. F., 57 Golden Hill St., Bridgeport, Conn.
Wheeler, F. H., 937 N. Meridian St., Indianapolis, Ind. "Schebler."
Winkley Co. (The), Box 243, Detroit, Mich. "Garllus."
Wray Pump and Register Co., 191 Mill St., Rochester, N. Y.

CEMENTS.

Diamond Rubber Co., Akron, Ohio. "Titan."
Excelsior Supply Co., 233 E. Randolph St., Chicago, Ill.
Fisk Rubber Co., Chicopee Falls, Mass. (Auto and bicycle.)
Goodrich, B. F., & Co., Akron, Ohio. "Goodrich."
Hartford Rubber Works Co., Hartford, Conn. "Hartford."
Hastings & Anderson, 116 Lake St., Chicago, Ill.
India Rubber Co., 16 Warren St., N. Y. City.
International Automobile and Vehicle Tire Co., Milltown, N. J.
M. & M. Mfg. Co., Akron, Ohio. (And acid curing solutions.)
National Cement and Rubber Mfg. Co., 3053-59 Monroe St., Toledo, Ohio. "Red Cross," "Anchor," "Pioneer," High Pressure, "A. & B."
Noonan Tool and Machine Works, 103-105 Dominick St., Rome, N. Y.
Pneu-Cure Co., 1133 Broadway, N. Y. City. "Pneu-Cure."
The Rath Mfg. Co., 1023-5 N. 3d St., Philadelphia, Pa.
Rubber Goods Repair Co., 89 16th St., Chicago, Ill.
Tingley & Co., Chas. O., Rahway, N. J.
Young, Orlando W., 174-180 Frelinghuysen Ave., Newark, N. J.

CHAINS (AUTOMOBILE).

Baldwin Chain and Mfg. Co., Dept. B, 31 Hermon St., Worcester, Mass. ("Baldwin" Detachable.)
Boston Gear Works, 152 Purchase St., Boston, Mass.
Diamond Chain and Mfg. Co., 241 W. Georgia St., Indianapolis, Ind.
Duryea Power Co., North River and Hockley Sts., Reading, Pa.
Link Belt Engineering Co., Hunting Park Ave. and P. & R. R. R., Nicetown, Philadelphia, Pa.
Meisel Press and Mfg. Co., 944-948 Dorchester Ave., Boston, Mass.
Morse Chain Co., Trumansburg, N. Y. (Silent Running High Speed.)
Snutsel Auto-Supply Co., 1534 Broadway, N. Y.
Whitney Mfg. Co. (The), Hartford, Conn.

CHAIN ADJUSTERS.

Aurora Automatic Machinery Co., Aurora, Ill. "Thor."
Clark, A. N., & Son, Plainville, Conn.
Corbin Screw Corporation, New Britain, Conn.
Worcester Pressed Steel Co., Worcester, Mass.

Insure Your Motor

Against Wear and Carbon Troubles by Using

INVADER OIL

The Oil That Graphitizes

Manufactured only by

Grades to Meet all Requirements

YOU NAME THE CAR

WE'LL NAME THE GRADE

CHAS. F. KELLOM & COMPANY, 128 Arch Street, Philadelphia

The Cigarette Par Excellence

Only the Finest Selected Turkish Tobacco Used. Try Them and be Convinced

Condax Extra Straw - - .35		Condax Special Straw - - .25	
Condax Extra Cork - - .35		Condax Special Cork - - .25	
Condax Extra Plain - - .30		Condax Special Plain - - .20	

E. A. CONDAX & CO., 305 Pearl Street, N. Y.

THEY SUPPLY YOUR WANTS—*Continued*

CHAIN CLEANING MATERIALS.

Cole, G. W., Co., 143 Broadway, N. Y. City. ("3-in-1.")
Excelsior Supply Co., 233 E. Randolph St., Chicago, Ill. ("Famous.")

CHAIN GUARDS, (AUTOMOBILE).

Automobile Equipment Co., 251 Jefferson Ave., Detroit, Mich.

CIGAR LIGHTER.

International Auto. and Yacht Agency, 119-121 Nassau St., N. Y. City. "Radium."
Rochester Auto. Co., Rochester, N. Y.
Snutsel Auto-Supply Co., 1534 Broadway, N. Y.

CLEANING COMPOUNDS.

Fisk Mfg. Co., Springfield, Mass. (Soap.)
Ford & Dennen, 16 Thayer St., Boston, Mass. (Soap.)

CLOCK HOLDERS.

Coleman, H. P., 66 Stanhope St., Boston, Mass.
Post — Lester Co. (The), 20 Sargeant St., Hartford, Conn. (Watch Holders.)

CLOCKS (AUTOMOBILE).

Brown, R. E., Whitney Building, Cleveland, O.
Bullard, J. H., Springfield, Mass. (Speedometer, odometer and clock combined.)
Chelsea Clock Co., 16 State St., Boston, Mass. (Also Boat.)
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Levy, Manasseh & Co., 182 Broadway, N. Y. City.
Meyrowitz, E. B., 104 E. 23d St., N. Y. City.
Motor Car Equipment Co. (The), 55 Warren St., N. Y. City.
Motor Car Specialty Co., 143 E. State St., Trenton, N. J. (Speedometer, Odometer and Clock Combined.)
Post & Lester Co. (The), 20 Sargeant St., Hartford, Conn.
The Electric Flash Light Clock.
Wilson Auto Clock Co. (The), 935 Arch St., Philadelphia, Pa.

CLOTHING (AUTO).

Automobile Equipment Co., 251 Jefferson Ave., Detroit, Mich. (Rubber Capes.)
Clark Glove Co., Peabody, Mass. (Leggings.)
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Gilbert Mfg. Co., New Haven, Conn. (Leggings, Sleeve Protectors.)
Laitin, I. & H., 289 Church St., N. Y. City. (Fur Lined Overcoats.)
Mesinger, H. & F., Mfg Co., 1801-3 First Ave., N. Y. City. (Leggings.)
Moore-Smith Co., 250 Devonshire St., Boston, Mass. (Fur and Fur Lined Coats.)
Nathan Novelty Mfg. Co., 88-90 Reade St., N. Y. City. (Sleeve Protectors.)
National India Rubber Co., Bristol, R. I. (Rubber Shirts.)
Post & Lester Co. (The), Hartford, Conn. (Leggings.)
Raymond, A., & Co., 129-133 Fulton St., N. Y. City. ("Raymond.")
Rosenthal & Katz, 52 W. 18th St., N. Y. City.
Scandinavian Fur and Leather Co., 14-16 W. 33d St., N. Y. City.
Snutsel Auto-Supply Co., 1534 Broadway, N. Y. City.
Stern Bros., W. 23d St., N. Y. City.

COLLAPSIBLE BUCKET.

Duplex Folding Pail Co., 114 E. 14th St., N. Y. City.
Durkee, C. D., & Co., 2 South St., N. Y. City.
Goodrich, B. F., Co., Akron, Ohio.

CYLINDER OIL.

Allerton Oil and Grease Co., 78 Broad St., N. Y. City.
Columbia Lubricants Co., 78 Broad St., N. Y. City.
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Fiske Bros. Refining Co., 59 Water St., N. Y. City.
Harris, A. W., Oil Co., 326 S. Water St., Providence, R. I.
Havemeyer Oil Co. (The), 80 Broad St., N. Y. City. "Havoline."
Hawes, Geo. A., 73 Pine St., N. Y. City.
Kellogg, E. H., & Co., 243 South St., N. Y. City. (Anti-Corrosive.)
Kellom, Chas. F., 128 Arch St., Philadelphia, Pa.
Miller's Sons, Wm. P., 79 3d St., Long Island City.
Musliner, Joseph L., & Co., 204-206 Maiden Lane, N. Y. City.
Pennsylvania Petroleum Co., 117 N. 2d St., Philadelphia, Pa.
Speare's, Alden, Sons Co. (The), 369 Atlantic Ave., Boston, Mass.
Valvoline Oil Co., 27 State St., Boston, Mass. "Valvoline."
Young, O. W., 180 Frelinghuysen Ave., Newark, N. J.

EMERGENCY CASES.

Mamedion Chemical Co., 314 E. 79th St., N. Y. City.
U. S. Emergency Case Co., 11 Weaver Bldg., Utica, N. Y.

ENGINE STARTERS.

Auto Improvement Co. (The), 304 Hudson St., N. Y. City. "Ever-Ready."
Lock Switch Mfg. Co., 20 Broad St., N. Y. City.

FILTERS.

Jones, Wm. S., 112 N. Broad St., Philadelphia, Pa.

FIRE EXTINGUISHERS.

Badger, E. B., & Sons Co., 63 Pitts St., Boston, Mass.
Boyd, J., & Son, 10 N. 4th St., Philadelphia, Pa.
Johns-Manville Co., H. W., 100 William St., N. Y. City.
Little Giant Mfg. Co. (The), 88 Wall St., N. Y. City. ("Little Giant.")
Rex Fire Extinguisher Co. (The), 152 Centre St., N. Y. City. ("Rex.")
U. S. Fire Extinguisher Mfg. Co., 134 W. 23d St., N. Y. City.

GOGGLES AND MASKS.

Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Funke, A. H., 83 Chambers St., N. Y. City.
Globe Optical Co., 403 Washington St., Boston, Mass.
Meyrowitz, E. B., 104 E. 23d St., N. Y. City.
Mills Mfg. Co. (The), 10 E. 23d St., N. Y. City.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Scandinavian Fur and Leather Co., 14-16 W. 33d St., N. Y. City.
Snutsel Auto-Supply Co., 1534 Broadway, N. Y. City.

GRAPHITE.

Dixon, Jos., Crucible Co., Jersey City, N. J. "Dixon," "L. A. W.," "No. 635." "Auto and Bi," "Graphioelo."

GREASES.

Allerton Oil and Grease Co., 78 Broad St., N. Y. City.
Columbia Lubricants Co., of N. Y., 78 Broad St., N. Y. City. "Monogram and Initial."
Fiske Bros. Refining Co., 59 Water St., N. Y. City. "Lubroleine."
Harris, A. W., Oil Co., 326 S. Water St., Providence, R. I. (Auto.)
Kellogg, E. H., & Co., 243-244 South St., N. Y. City. "Anti-friction," "Excelsior."
Rubay, Leon, 140 W. 38th St., N. Y. City.
Speare's, Alden, Sons Co. (The), 369 Atlantic Ave., Boston, Mass.
Vacuum Oil Co., 29 Broadway, N. Y. City.

HORNS (AUTOMOBILE).

Automobile Supply Mfg. Co., 320 Driggs Ave., Brooklyn, N. Y.
Exhaust Horn, New Jersey Tube Co., Newark, N. J.
New Jersey Tube Co., Newark, N. J. (Exhaust Horn.)
Funke, A. H., 83 Chambers St., N. Y. City.
Gabriel Horn Mfg. Co., 970-72 Hamilton St., Cleveland, Ohio.
Gleason-Peters Air Pump Co., 20 W. Houston St., N. Y. City.
Goodrich, B. F., Akron, Ohio.
Hutchinson Electric Horn Co., Suite 9033, No. 1 Madison Ave., N. Y. City.
Manhattan Screw and Stamping Works, Seventh Ave. and 11th St., N. Y. City.
Motor Car Equipment Co. (The), 55 Warren St., N. Y. City.
New York Coach and Auto Lamp Co., 798 Tenth Ave., N. Y. City.
Riley & Klotz, 17-19 Mulberry St., Newark, N. J.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Snutsel Auto-Supply Co., 1534 Broadway, N. Y. City.
Willis, E. J., Co., 10 Park Place, N. Y. City.
Twentieth Century Mfg. Co., 19 Warren St., N. Y. City. "Twentieth Century."

HOUSES (AUTOMOBILE).

C. & A. Patented Building Construction Co., 170 Broadway, N. Y. City.
Premier Mfg. Works, St. John, Mich.
Smith, H. W., Room 1512, No. 66 Broadway, N. Y. City.
Springfield Moulding Works, 58 Waltham Ave., Springfield, Mass.

IGNITION BATTERIES.

American Electrical Novelty and Mfg. Co., Spring, Hudson and Vandam Sts., N. Y. City. (Ever-Ready.)
Dayton Electrical Mfg. Co. (The), 609-12 Reibold Bldg., Dayton, Ohio. (Apple-Duplex.)
Dayton Mfg. Co., Dayton, Ohio.
Dow Portable Electric Co., Braintree, Mass.
Eastern Carbon Works, West Side Ave. and Central R. R., Jersey City, N. J.
Edison Storage Battery Co., Glen Ridge, N. J.
Electric Contract Co., 202-4 Centre St., N. Y. City.
Empire State Dry Battery Co., 70 Fulton St., N. Y. City.
Gould Storage Battery Co., 1 West 34th St., N. Y. City. "Gould."
Hutchinson Electric Horn Co., Suite 9033, No. 1 Madison Ave., N. Y. City.
National Battery Co., 368-382 Massachusetts Ave., Buffalo, N. Y. "Sperry."
National Carbon Co., W. Madison and Highland Aves., Cleveland, Ohio. "Columbia."
New England Motor Co., 82 Fletcher St., Lowell, Mass.
Nungesser Electric Battery Co., 27-33 King St., Cleveland, Ohio.
Pittsfield Spark Coil Co., Pittsfield, Mass.
Roche, Wm., Dry Battery Co., 52-54 Park Place, N. Y. City.
Royal Battery Co., 143 Chambers St., N. Y. City. (National Sales Corporation, 256 Broadway, N. Y. Factory Sales Mgr.) "Geecee."
Rubay, Leon, 140 W. 38th St., N. Y. City.
Snutsel Auto-Supply Co., 1534 Broadway, N. Y. City.
Electric Storage Battery Co. (The), Philadelphia, Pa.
United Electrical Mfg. Co., 53 Vesey St., N. Y. City. "Crescent."
Willard Storage Battery Co., 29 Academy St., Cleveland, Ohio.

THEY SUPPLY YOUR WANTS—*Continued*

Witherbee Ignitor Co., 541 N. 43d St., N. Y. City.

IMPORTERS (AUTO GOODS).

Angiulli, Luigi, 180-182 Centre St., N. Y. City. (Angelicus Lamps.)
Champion, Albert, Co., 541 Tremont St., Boston, Mass. (Spark plugs, spark coils, storage batteries, limousine electric lights, ignition wire, magnetos, oilers, ammeters, voltmeters and siren whistles.)
Coops, C. W., Co., 3 Appleton St., Boston, Mass.
Dac Automobile Supply House, 1739 Broadway, N. Y. City.
Excelsior Supply Co., 233-237 Randolph St., Chicago, Ill.
Heller, Joseph S., 123 W. 52d St., N. Y. City. ("Pipe" cars, "Simms" safety buffers.")
Herz & Co., 189 Elm St., N. Y. City. (French coils and storage batteries.)
Holcombe & Co., 45 Vesey St., N. Y. City. (Spark plugs.)
Manufacturers' Agency Co., 1679 Broadway, N. Y. City. (Automobile parts.)
Miller, Chas. E., 97-101 Reade St., N. Y. City. (Auto parts and supplies; auto jewelry and horns.)
Motor Car Equipment Co., 55 Warren St., N. Y. City. (Accessories and supplies.)
Napier Motor Co., of America, 743 Boylston St., Boston, Mass. (Napier motor cars, launches, motors and transmissions.)
National Automobile Co., 205-9 E. 86th St., N. Y. City. (Mercedes parts.)
N. Y. Sporting Goods Co., 17 Warren St., N. Y. City.
Post & Lester Co. (The), 20 Sargeant St., Hartford, Conn. (Horns, lamps, ammeters, spark plugs, voltmeters, spark coils and goggles.)
Rubay, Leon, 140 W. 38th St., N. Y. City. (Continental and Michelin tires, auto horns, La Coste ignition apparatus.)
Smith & Mabley, Inc., Broadway, between 56th and 57th Sts., N. Y. City. (Billy lamps, "Panhard," "Renault" and "Mercedes" cars, "Hercules" anti-skid tires.)
Snutsel Auto-Supply Co., 1534 Broadway, N. Y. City.
Stallforth, G., & Co., 396-398 Broadway, N. Y. City. (Spark plugs, mica cores.)
Sussfield, Lorsch & Co., 37 Maiden Lane, N. Y. City. (Miscellaneous French auto supplies.)

INSURANCE (AUTO).

Aetna, Hartford, Conn.
Carlough & Smith, 196 Market St., Newark, N. J.
Tobin, Joshua F., 500 Fifth Ave., N. Y. City.
Travelers', Hartford, Conn.

JACKS.

Auto Bed Co. (The), 36 Columbus Ave., Boston, Mass. "Autobed."
Buckeye Jack Mfg. Co, (The), Louisville, Ohio.
Duff Mfg. Co., Westinghouse Bldg., Pittsburg, Pa. "Barrett."
Hardy, R. E., Co. (The), 225 W. Broadway, N. Y. City.
Jersey Brake Co., 56 Columbia St., Newark, N. J. "Searls."
Pope Mfg. Co., Hartford, Conn. "Kenosha."
Roth Jack and Tool Co., Room 508, 68 William St., N. Y. City.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Wray Pump and Register Co., 191 Mill St., Rochester, N. Y.

JUVENILE FOOT AND HAND PROPELLED VEHICLES.

Toledo Metal Wheel Co., Toledo, Ohio.

LAMPS (AUTOMOBILE).

American Lamp Co., 83-85 Randolph St., Detroit, Mich.
American Lamp Works, 66 W. 43d St., N. Y. City.
Angiulli, Luigi, 180-182 Centre St., N. Y. City.
Atwood Mfg. Co., Amesbury, Mass.
Badger Brass Mfg. Co. (The), Kenosha, Wis. "Solar."
Boesch Lamp Co., 1569 Grove St., San Francisco, Cal.
Dayton Electrical Mfg. Co. (The), 609-612 Reibold Bldg., Dayton, Ohio. (Combined lighting and igniting outfits.)
Dietz, R. E., Co., N. Y. City.
Edmunds & Jones Mfg. Co., 313-315 Riopelle St., Detroit, Mich.
Elbridge Electrical Mfg. Co., Elbridge, N. Y.
Funke, A. H., 83 Chambers St., N. Y. City.
General Electric Co., Schenectady, N. Y.
Gray & Davis, Amesbury, Mass.
Gray, Peter & Sons, 88-90 Union St., Boston, Mass.
Ham, C. T., Mfg. Co., Rochester, N. Y. "Ham," "Cold Blast."
Hine-Watt Mfg. Co., 69 Wabash Ave., Chicago, Ill.
Manhattan Screw and Stamping Works, Seventh Ave. and 11th St., N. Y. City.
Motor Car Equipment Co. (The), 55 Warren St., N. Y. City.
New York Coach and Auto Lamp Co., 798 Tenth Ave., N. Y. City.
Post & Lester Co. (The), 20 Sargeant St., Hartford, Conn.
Rose Mfg. Co., 910 Arch St., Philadelphia, Pa. "Neverout."
Rubay, Leon, 140 W. 38th St., N. Y. City.
Scoville & Peck Co., 15 Wooster St., New Haven, Conn. "Peck."
Snutsel Auto-Supply Co., 1534 Broadway, N. Y. City.
Twentieth Century Mfg. Co., 19 Warren St., New York City. "Twentieth Century."

LICENSE TAGS.

Automobile Equipment Co., 251 Jefferson Ave., Detroit, Mich.
Boyle, John & Co., 112-114 Duane St., N. Y. City. (And lamp numbers.)
Dentzeau, Geo., 161 Grand St., N. Y. City.
Lighthouse, Chas. F. & Co., 176 Broadway, N. Y. City.
McKinnon Dash Co., Amherst St., Buffalo, N. Y.
Lesinger, H. & F. Mfg. Co., 1801 First Ave., N. Y. City.
Post & Lester Co., The, Hartford, Conn.

LOCK SWITCHES.

Lock Switch Co., 20 Broad St., N. Y. City.

MONOGRAMS (BRASS).

The Chandler Co., 31 Taylor St., Springfield, Mass.

NAME PLATES.

The Chandler Co., 31 Taylor St., Springfield, Mass.
Walter, N. C. & Sons, 194 William St., N. Y. City.

ODOMETERS.

Bullard, J. H., Springfield, Mass. (Speedometer, odometer and clock combined.)
Jones, Jos. W., 127 W. 32d St., N. Y. City. ("Jones.")
Loring, E. J., Somerville, Mass. (Combined speedometers and odometers.)
Motor Car Specialty Co., 143 State St., Trenton, N. J. (Combination speed meter, odometer and clock.)
Rollins Mfg. Co., Park Sq. Motor Mart, Boston, Mass. (Combined speedometers and odometers.)
Smith, R. H. Mfg. Co., Springfield, Mass. (Combined speedometer and odometer.)
Veeder Mfg. Co., Sargeant and Garden Sts., Hartford, Conn. ("Veeder.")
Warner Instrument Co. (Auto-Meter), Beloit, Wis.
Wood Speedometer Co., 106 Sudbury St., Boston, Mass.

OILS.

(See also Cylinder Oil.)

Allerton Oil and Grease Co., 78 Broad St., N. Y. City.
Borne-Scrymser Co., 135 Front St., N. Y. City. "Colonial."
Columbia Lubricants Co., 78 Broad St., N. Y. City.
Cook's, Adam, Sons, 313 West St., N. Y. City.
Harris, A. W. Oil Co., 326 S. Water St., Providence, R. I.
Hawes, Geo. A., 73 Pine St., N. Y. City.
Kellogg, E. H., & Co., 243-244 South St., N. Y. City.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Speare's, The Alden, Sons Co., 369 Atlantic Ave., Boston, Mass.
Vacuum Oil Co., 29 Broadway, N. Y. City.
White & Bagley Co., Worcester, Mass. "Oilzum."
Young, O. W., 180 Frelinghuysen Ave., Newark, N. J.

POLISHES (METAL).

Armstrong & Co., Kalamazoo, Mich. ("Monarch.")
Cole, G. W., Co., 143 Broadway, N. Y. City. "R. K." and "3 in 1.")
Columbia Lubricants Co., of N. Y., 78 Broad St., N. Y. City.
Edmonds, J., Wesley & Son, 216 Franklin St., N. Y. City. (Electric.)
National Cement and Rubber Mfg. Co., 3053-59 Monroe St., Toledo, Ohio.
Newbern, The S. C. Co., 505 Quarry St., Phila., Pa.
New Jersey Paint Works, Jersey City, N. J.
Raimes & Co., 50 Ferry St., N. Y. City.

PUMPS (AUTOMOBILE TIRE).

Bridgeport Brass Co., 253 Broadway, N. Y. City.
Cleveland Faucet Co., Cleveland, Ohio.
Gleason-Peters Air Pump Co., 20 W. Houston St., N. Y. City.
Jones, Wm., S., 112 N. Broad St., Phila., Pa.
Manhattan Screw and Stamping Works, 7th Ave.
Post & Lester Co., 20 Sargeant St., Hartford.
R. & C. Indicator Co., Bridgeport, Conn.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Skinner & Skinner, 4133 Indiana Ave., Chicago, Ill.
Spacke, F. W. Machine Co., Indianapolis, Ind.
Tiley Pratt Co., Essex, Conn.
Ultra Pump and Power Co., Auburn, N. Y.
Wray Pump & Register Co., 191 Mill St., Rochester, N. Y.

RADIATORS.

A. Z. Co., 527 W. 56th St., N. Y. City.
Fedders Mfg Co., Buffalo, N. Y
Kells, W J., Mfg. Co., 66 Van Winkle St., Jersey City, N. J.

RAIN APRONS.

Boyle, John W. & Co., 112-114 Duane St., N. Y. City.
Gilbert Mfg. Co., New Haven, Conn.
Indianapolis Dash Co., Indianapolis, Ind.
Nathan Novelty Mfg. Co., 88-90 Reade St., N. Y. City. (Rain and dust aprons.)
Perfection, The Storm Shield Co., S. Main St., Clyde, Ohio.
Springfield Auto. Top and Upholstering Co., 102-106 Dwight St., Springfield, Mass.

SCHOOLS.

Manhattan Automobile School, 315-21 W. 96th St. N. Y. City.
New York School of Automobile Engineers, 146 W. 56th St., N. Y. City.

SECOND-HAND AUTOMOBILES.

Graham Cycle Co., 601-605 Madison St., Chicago, Ill.
Broadway Auto. Exchange, Inc., 513-15 7th Ave., N. Y. City.
Inter-State Auto. Touring Co., 5 E. 42d St., N. Y. City.
Manhattan Storage Co., 42-44 Cortlandt St., N. Y. City.
Manufacturers' Motor Car Co., 54-56 W. 43d St., N. Y. City.
Times Square Auto Co., 164 W. 46th St., N. Y. City.

SHOCK ABSORBERS AND AUXILIARY SPRINGS.

Baldwin Chain and Mfg. Co., Dept. B, 31 Herman St., Worcester, Mass. "House."
Diezemann Shock Absorber Co., 1311 Hudson St., Hoboken, N. J.
Gabriel Horn Mfg. Co., 970-972 Hamilton St., Cleveland, Ohio. "Foster."
Godshalk, E. H. & Co., 23d and Hamilton Sts., Philadelphia, Pa.
Graham Co., The, 84 Waumbeck St., Boston, Mass.
Hartford Suspension Co., 67 Vestry St., N. Y. City.
Indianapolis Bolster Spring Co., Indianapolis, Ind. "Victor."
Kelsey Suspension Co., Tarrytown, N. Y.
Kilgore Auto. Air Cushion Co., 46 Columbus Ave., Boston, Mass. "Kilgore."
Sheddan Mfg. Co., The 138 W. Fayette St., Baltimore, Md.
Supplementary Spiral Spring Co., The, 4524-4562 Delmar Ave., St. Louis, Mo.

SPARK COILS.

Connecticut Telephone & Electric Co., Meriden, Conn.
Goodson Electric Ignition Co., 94 Point St., Providence, R. I. (Also primary "Goodson.")
Hardy, R. E. Co., 225 W. Broadway, N. Y. City.
Heinze Electric Co., Lowell, Mass.
McKibbon Mfg. Co., S. Norwalk, Conn.
Mosler, A. R. & Co., 1679 Broadway, N. Y. City.
National Carbon Co., W. Madison and Highland Ave., Cleveland, Ohio. "National."
National Coil Co., 115-117 Michigan Ave., Lansing, Mich.

COMPLETE LISTS
Auto Owners' Garages
DEALERS, JOBBERS AND MANUFACTURERS
New Names, Daily, Weekly or Monthly
MOTOR DIRECTORIES CO., Incorporated Successors to Auto Directories Co. 108 Fulton St., New York City 'Phone 497 John

THEY SUPPLY YOUR WANTS—*Continued*

Never-Miss Spark Plug Co., Lansing, Mich.
New York Coil Co., 338 Pearl St., N. Y. City.
Noxon, C. P., 500 E. Water St., Syracuse, N. Y.
Ohio Elec. Works, 76-78 Ellen St, Cleveland, O.
Pittsfield Spark Coil Co., Pittsfield, Mass.
Roche, Wm., Dry Battery Co., 52-54 Park Place, N. Y. City.
Rogers, Geo. D., Automobile Parts Mfg. Co., 56 Kinsman St., Cleveland, Ohio.
Rubay, Leon, 140 W. 38th St., N. Y. City. (Lacoste.)
Schug Electric Mfg. Co., Champlain and Beaubien Sts., Detroit, Mich.
Seidler-Miner Electric Co., 207-211 Jefferson Ave., Detroit, Mich.
Snutsel Auto-Supply Co., 1534 B'way, N. Y. City.
Splitdorf, C. F., 23 Vandewater St., N. Y. City.
Williams, E. Q., 535 S. Clinton St., Syracuse N. Y.

SPARK PLUGS.

A. Z. Co., 527 W. 56th St., N. Y. City.
Gilbough, B. G., Room 312, 36 La Salle St., Chicago, Ill
Hardy, R. E., Co., 225 W. Broadway, N. Y. City.
Hatcher Auto-Parts Co., The, 138 Viaduct, Cleveland, Ohio.
Herz & Co., 189 Elm St., N. Y. City, Bougie "Herz"
Induction Coil Co., The, 9-10-11 Miller Bldg., Milwaukee, Wis.
Kokomo Electric Co., The, Kokomo, Ind.
Lipman, Carl E. L., Beloit, Wis. "Billy Hell."
Little & Eastman Co., 595 Harrison Ave., Boston, Mass.
Mayo Damper Co., 355 Walnut St., Pottstown, Pa.
Mezgar, C. A., 203 W. 80th St., N. Y. City. (National Sales Corporation, 256 Broadway, New York City, Factory Sales Mgr.)
Miller, Chas. E., 97-101 Reade St., N. Y. City.
Mosler, A. R., & Co., 1679 Broadway, N. Y. City. "Spit Fire."
Never-Miss Spark Plug Co., Lansing, Mich. "Never Miss."
Oakes & Dow Co., The, 40 Sudbury St., Boston, Mass. "Comet" and "Sootless."
Pittsfield Spark Coil Co., Pittsfield, Mass. "Jewel."
Pope Mfg. Co., Hartford, Conn.
Post & Lester Co., The, 20 Sargeant St., Hartford, Conn.
Rajah Auto-Supply Co., 140 Washington St., N. Y. City.
Richards, F. H., 15 Murray St., N. Y. City.
Richardson Engineering Co., 36 Pearl St., Hartford, Conn.
Roche, Wm., Dry Battery Co., 52-54 Park Place, N. Y. City.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Seidler-Miner Electric Co., 207-211 Jefferson Ave., Detroit, Mich. "S. M."
Snutsel Auto Supply Co., 1534 B'way, N. Y. City.
Splitdorf, C. F., 23 Vandewater St., N. Y. City.

SPEED INDICATORS.

Bullard, J. H., Springfield, Mass. (Speedometer, odometer, clock combined.)
Chromo-Velocimeter Co., The, 1213 Filbert St., Philadelphia, Pa.
Jones, Jos. W., 127 W. 32d St., N. Y. City. "Jones." (Auto, Boat and Cycle.)
Jones, Wm. S., 112 N. Broad St., Philadelphia, Pa. (Lea Speedistimeter and Lea Speedmeter.)
E. T. Kimball Co., (Abell Speedometer), 1779 B'way, N. Y. City.
Monitor Speed Recorder Co., 247 Pearl St., Cambridge, Mass.
Motor Car Specialty Co., 143 E. State St., Trenton, N. J. (Combination speed meter, odometer and clock.)
Rollins Mfg. Co., Park Square Motor Mart, Boston, Mass. (Combined speedometers and odometers.)
Rubay, Leon, 140 W. 38th St., N. Y. City.
Smith, R. H., Mfg. Co., Springfield, Mass. (Also speedometer and odometer, combined.)
Veeder Mfg. Co., Sargeant and Garden Sts., Hartford, Conn. "Veeder Tachometer."
Warner Instrument Co. (Auto-Meter), Beloit.

TIRES (AUTOMOBILE).

Ajax Standard Rubber Co., 420-430 E. 106th St., N. Y. City.
American Wood Tire Co., 911 Monadnock Building, Chicago, Ill. (Wood.)
Bailey, C. J., & Co., 22 Boylston St., Boston, Mass. (Licensors.) "Bailey Won't Slip."
Broadway Rubber Tire Co., 253 W. 47th St., N. Y. City.
Consolidated Rubber Tire Co., 40 Wall St., N. Y. City. "Kelly-Springfield."
Continental Caoutchouc Co., 43 Warren St., N. Y. City. "Continental."
Continental Rubber Works, Erie, Pa.
Diamond Rubber Co., Akron, Ohio. "Diamond."
Electric Rubber Mfg. Co., Rutherford, N. J.
Firestone Tire and Rubber Co., Akron, Ohio. "Firestone."
Fisk Rubber Co., Chicopee Falls, Mass. "Fisk," "Mechanically Fastened."
G. & J. Tire Co., Indianapolis, Ind. "G. & J."
Gaulois Tire Co., 1739 B'way, N. Y. City. "Gaulois" (Imported).
Goodrich, B. F., Co., Akron, Ohio. "G. & J."
Goodyear Tire and Rubber Co., Akron, Ohio. "Ajax" and "Goodyear."
Harburg Tire Co., 232 W. 58th St., N. Y.
Healy Leather Tire Co., 88 Gold St., N. Y. City.
H., M. & S. Armored Tire Co., Pittsburg, Pa.
Hartford Rubber Work Co., Hartford, Conn. "Hartford," "Dunlop," "Turner."
Ideal Auto Tire Co., 1150 Fourteenth Ave., Detroit, Mich. "Ideal."
India Rubber Co., 16 Warren St., N. Y. City. "India."
International Auto and Vehicle Tire Co., Milltown, N. Y. "International Fox Brand," "International Endurance," "International G. & J."
Kokomo Rubber Co., Kokomo, Ind.
Krotz Mfg. Co., Springfield, Ohio. (Cushion.)
May & Wells, 11 Abbott St., Detroit, Mich.
Mesinger, H. & F., Mfg. Co., 1801 First Ave., N. Y. City. (Leather.)
Michelin Products Selling Co., 31 and 33 W. 31st St., N. Y. City. "Michelin" (Imported).
Mitchell Punctureless Pneumatic Tire Co., 324 Essex St., Swampscott, Mass.
Morgan & Wright, 331-339 W. Lake St., Chicago, Ill.
Motz Clincher Tire and Rubber Co., Akron, O.
Palmer, H. A., 54 Fay St., Akron, Ohio. (Mechanically fastened.)
Pennsylvania Rubber Co., Jeannette, Pa.
Republic Rubber Co., Youngstown, Ohio.
Rubay, Leon, 140 W. 38th St., N. Y. City.
Rubber Tire Co., 1215 Arch St., Philadelphia. "Lattina" (Cellular).
St. John Rubber Tire Co., 116 Broad St., N. Y. City. (Cushioned.)
Salisbury Tire Association, Owosso, Mich.
Samson Tire Co., 12 W. 33d St., N. Y. City.
Single Tube Auto and Bic. Tire Co., 253 Broadway, N. Y. City. (Licensors under Tillinghast Patents.)
Swinehart Clincher Tire and Rubber Co., Akron, Ohio.
Tennant Auto Tire Co., 131 W. Main St., Springfield, Ohio.
The Universal Tire Co., 623 St. James Bldg., N. Y. City. (Cushion.)
Traction Tread Tire Co., 1655 B'way, N. Y. City.
Voorhees Rubber Co., 303 W. 54th St., N. Y. City.
Western Rawhide Belting Co., 7th and National Ave., Milwaukee, Wis. Leather.

TIRE ADJUSTERS.

Long & Mann Co., 520 Central Bldg., Rochester, N. Y.

TIRE BRACKETS.

Gilbert Mfg. Co., New Haven, Conn.

TIRE PROTECTORS.

Empire Rubber Mfg. Co., The, P. O. Box 34, Trenton, N. J.
Gilbert Mfg. Co., New Haven, Conn. (Tire bands and sleeves.)
Leather Tire Goods Co., The, Newton Upper Falls, Mass. "Woodworth."
M. & M. Mfg. Co., Akron, Ohio.
Manning Mfg. Co., Whitney Bldg., Springfield, Mass.
Pneumatic Tire Protector Co., The, Dayton, Ohio.

TIRE PRESSURE INDICATORS.

Lock Switch Mfg. Co., 20 Broad St., N. Y. City.

TIRE REPAIR KITS (AUTOMOBILE).

Continental Caoutchouc Co., 43 Warren St., N. Y. City.
Diamond Rubber Co., Akron, Ohio.
Goodrich, B. F., Co., Akron, Ohio.
Goodyear Tire & Rubber Co., Akron, Ohio.
Hartford Rubber Works Co., Hartford, Conn.
International Automobile and Vehicle Tire Co., Milltown, N. J.
National Cement and Rubber Mfg. Co., 3053-3059 Monroe St., Toledo, Ohio.
Tingley, Chas. O. & Co., Rahway, N. J.

TOPS (AUTOMOBILE).

Automobile Cover and Top Mfg. Co., 148 W. 56th St., N. Y. City.
Auto Top and Specialty Co., Broadway and 63d St., N. Y. City.
Brock Carriage and Wagon Co., The, 417-21 Cass Ave., Cleveland, Ohio.
Detroit Carriage Co., Detroit, Mich.
Duane, W. J., & Co., 1771 Broadway, N. Y. City. (Canopy.)
Morton, Robert E., 26 South St., N. Y. City.
Quinby, J. N., & Co., 1534 Broadway, N. Y. City.
Rands Mfg. Co., 51-55 Macomb St., Detroit, Mich.
Russell, H. J., Worcester, Mass.
Sprague Umbrella Co., Norwalk, Conn. ("Sprague.")
Springfield Auto Top and Upholstering Co., 102-6 Dwight St., Springfield, Mass.
Springfield Metal Body Co., Brightwood, Springfield, Mass.

AUTOMOBILE MAGAZINE

¶ Is the best advertising medium in the automobile field.

¶ It has the best circulation among people who buy automobiles and their accessories.

¶ It reaches all the garages in the country and is consulted by the men who order automobile supplies.

¶ Persons wishing to see all the automobile news in condensed form prefer the Magazine to any other publication.

SUBSCRIPTION $1.00 A YEAR

Send for Specimen Copy

AUTOMOBILE PRESS, 136 LIBERTY STREET, NEW YORK

MAR 5 1907

BOOKS FREE

WITH

American Industries

(THE MANUFACTURER'S PAPER)

THE National Association of Manufacturers has made arrangements with the authors and publishers of three of the best books recently written for business men, by which it is able to offer any of these books free with a yearly subscription to AMERICAN INDUSTRIES, the organ of the Association.

The books are the following:

A Traveller in South America, by F. B. Wiborg, of Ault & Wiborg, printing ink manufacturers.

Why a Boy Should Learn a Trade, by Peter M. Kling, Pittsburg manufacturer and capitalist.

The Metric Fallacy, by Frederick A. Halsey and Samuel S. Dale.

¶Probably you may know American Industries. The paper in 1907 will be far more interesting than it has ever been before, with---especially---a wealth of matter relating to the entire Foreign Trade proposition, embracing articles in every number, on this important subject.

¶The offer is a simple one. Send two dollars for a year's subscription to American Industries with the name of the book you wish. The book and the paper will be sent to you for the price of the paper alone. Address:

AMERICAN INDUSTRIES

820 MAIDEN LANE BUILDING NEW YORK

"THE OLD DIETZ MOTOR LAMPS RELIABLE"

DIETZ STERLING
An admirable equipment for Limousines and Landaulets.

OUR LEADING STYLES FOR 1907 MADE ON OUR ORIGINAL **COLD BLAST** CONSTRUCTION. GUARANTEED TO STAY LIGHTED AND GIVE THE MAXIMUM ILLUMINATION. THEY HAVE THE EXPERIENCE OF 67 YEARS OF LAMP BUILDING BEHIND THEM. WRITE FOR COMPLETE 1907 CATALOGUE.

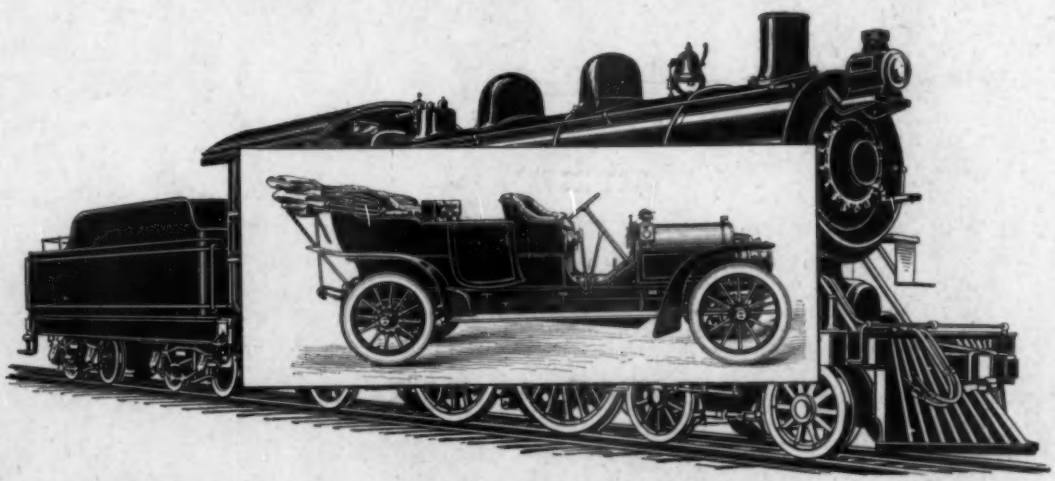
See Our Exhibit, Spaces 161 and 162, Mechanics Bldg., Boston, Mass.

DIETZ ROYAL
Particularly adapted for use on Heavy Cars.

R. E. DIETZ COMPANY

60 Laight Street — Largest Makers of Lanterns in the World — ESTABLISHED 1840 — **NEW YORK, U. S. A.**

AMERICAN LOCOMOTIVE MOTOR CAR



AMERICAN LOCOMOTIVE LICENSE BERLIET MOTOR CAR

1886 BROADWAY, NEW YORK.

WALDEN W. SHAW, General Agent,
1532 Michigan Avenue, Chicago, Ill.

H. OSCAR BROWN, Agent,
229 North Broad Street, Philadelphia, Pa.

C. F. WHITNEY, Agent,
Care of Park Square Auto Station, 43 Columbus Avenue, Boston, Mass.

Vol. X. No 3 MARCH, 1907

AUTOMOBILE MAGAZINE

Published by THE AUTOMOBILE PRESS
ANGUS SINCLAIR, Editor
136 Liberty Street, New York

MONTHLY
Price, 10 Cents

Member American Motor Car Manufacturers' Association.

"ST. LOUIS"
MOTOR CARS

THE WORLD'S BEST
MODEL 18
NOW OFFERED BY AMERICA'S PIONEER MOTOR MFRS. FOR 1907

THE most refined and elegant machine to be had. Very simple 35 H. P. 4 cylinder Motor with every known improvement. Quiet in operation, very speedy, shaft drive, integral construction, three point suspension, graceful lines and finished most artistically. What more could you ask? Catalogs free.

ST. LOUIS MOTOR CAR CO.
PEORIA, ILLS.